IDG
•net

SPAM STRIKE

QuickStudy shows you ways to keep that pesky electronic junk mail under control. Page 70

Windows 2000
Professional

MOVING COSTS

Here's how much the migration from Windows 95 to Windows 2000 could cost. Page 20

MELISSA ARREST

Suspect in virus case arrested in New Jersey as users continue cleanup battle. Page 14

COMPUTERWORLD

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APRIL 5, 1999 ▪ VOL. 33 ▪ NO. 14 ▪ $4 COPY

WINDOWS 2000 MAY SHIP MINUS TOOLS

Microsoft eyes October release, but may hold off on some management features to make deadline

BY SHARON GAUDIN

Microsoft Corp. last week confirmed it's aiming for an Oct. 6 release for Windows 2000. But sources who were briefed said that although all the features will be included, some — such as Active Directory and Intellimirror — will lack integral management tools.

BLACK/TOBY

ECONOMETRICS' Brian McGuire: 'What's the point?'

A source inside Microsoft said Oct. 6 is a "target date" that is "100% subject to review and change." He added, "We couldn't give it a [final ship] date before Beta 3 even ships." Beta 3 is supposed to ship April 21, but a commercial shipping date for Windows 2000 has been elusive.

Analysts and third-party developers building Windows 2000-related products said Microsoft is leaving out some management tools in order to get the operating system out the door.

"It's becoming painfully obvious that Windows 2000 will not ship intact," said Steve Kleynhans, an analyst at Meta Group Inc. in Toronto. "The reality is, if Microsoft finds that some of those features are going to delay the release, they start machete programming."

Some users said that after waiting three years for Windows 2000, they would rather wait a little longer and get those extra tools.

Microsoft "should wait until a lot of those things are ready," said Brian Moses, assistant

Windows 2000, page 97

CA BUYOUT WORRIES PLATINUM USERS

Product longevity, support said to be key

**BY BOB WALLACE
AND THOMAS HOFFMAN**

Computer Associates International Inc. may see nothing but bright skies ahead with its planned $3.5 billion acquisition of rival Platinum Technology Inc. But several Platinum customers were worried last week about the fate of the products they depend on today.

"CA and Platinum have competing products in security and job scheduling. So will [CA] continue to maintain and enhance all of them or let some atrophy?" asked Mike Mueller, a senior systems analyst at Northwestern Mutual Life Insurance Co. in Milwaukee. He echoed the concerns of many who use products from both vendors.

"They need to address this as quickly as possible," Mueller

CA, page 16

MOTTS TURNS ERP UP A NOTCH

Goal: Faster shipments, more precise planning

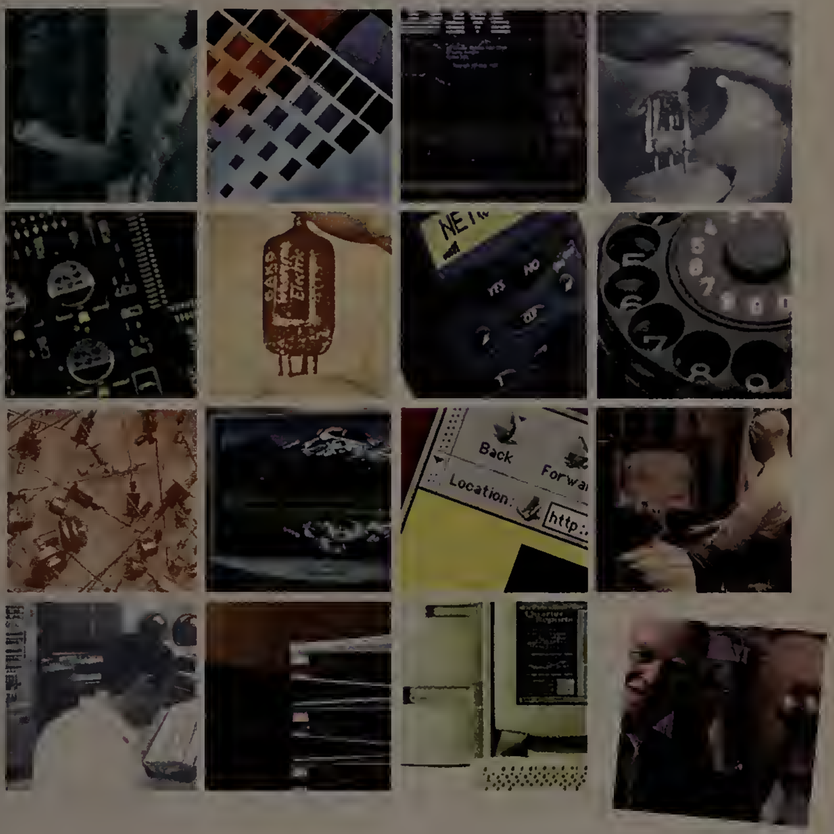
BY CRAIG STEDMAN

Like many companies, Motts North America Inc. used ERP software to make itself more efficient. Now the juice and applesauce maker wants more.

Motts is one of the users leading the charge to wring more strategic business value — and higher paybacks — out of their enterprise resource planning systems by augmenting them with advanced planning and analysis applications.

Next month, the Stamford, Conn., company plans to be one of the first users to go live with SAP AG's new supply-chain planning software. That

Motts, page 16



TOP 100

STEP ASIDE, TOM BROKAW and Peter Jennings. *Computerworld*'s look at the 20th century is a fast-paced tour of the technologies that changed the way we gather, move and use information. These include the IBM System 360, the Web, the transistor and even the credit card. Columnist Frank Hayes is your guide, along with commentators such as Max Hopper, John Gantz, Paul A. Strassmann, Peter G. W. Keen, Robert Kahn and Jack Welch.

20th-CENTURY TECHNOLOGIES

Report starts on page 74

KOSOVO E-MAIL PRIVACY IS AT RISK

Insecure encryption may flag identities

BY ANN HARRISON

Connections to two special services recently set up to protect online identities of Kosovars, Serbs and others reporting on the war are vulnerable, *Computerworld* has learned.

Anonymizer Inc. in La Mesa, Calif., set up the free service (*www.anonymizer.com/kosovo*) through its Kosovo Privacy Project to provide confidential Web browsing and e-mail. But security experts caution that the process of sending messages to the site isn't secure, and a request for an anonymous posting could be "sniffed" off the network. In addition, the very act of connecting to a privacy site could flag Serb authorities.

The Internet is being used in Kosovo and other parts of Yugoslavia to bypass attempts at

Kosovo, page 97

NEWSPAPER

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DMI Discovery	✓	
DNS Discovery	✓	
Distributed State Machine	✓	
Event Management	✓	✓
Built-In Event Correlation	✓	
Frame Relay Option	✓	
Frame Relay Service Option	✓	
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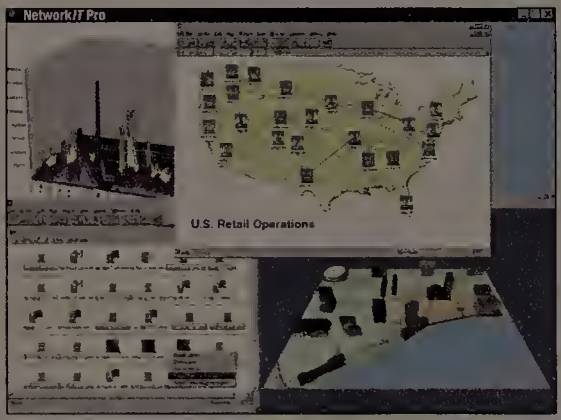
Built-In RMON Analysis	✓	



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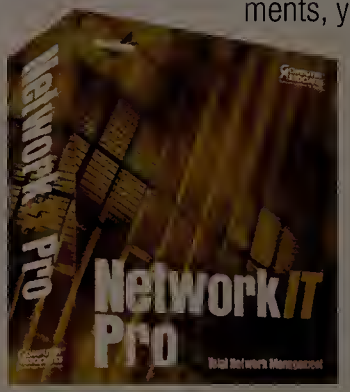

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WANT A FREE BMW?

According to *Computerworld*'s Quarterly Hiring Survey, IT managers desperate to fill key positions are offering perks and benefits, such as this BMW Z3 sports car. Page 56

RESELLING RECOMMENDATIONS

The *Consumers Digest* Web team discovered ads are good, but the real opportunity is in licensing. Page 36

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APRIL 5, 1999

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> “THEY CAN REORGANIZE ALL THEY LIKE, BUT THE GOAL IS STILL TO GET CUSTOMERS TO BUY ALL THEIR PRODUCTS ACROSS ALL PLATFORMS. IT'S MORE RHETORIC THAN ANYTHING ELSE.
>
> MARK LEVITT, AN IDC ANALYST, ON MICROSOFT'S REORGANIZATION.

AT DEADLINE

Continental Flies Safe Y2K Test

Houston-based Continental Airlines Inc. Friday said it had completed a successful airborne year 2000 test of its aircraft systems. In a Boeing 737-700 on a one-hour flight over Houston on April 1, Continental said it simulated a date change from Dec. 31 to Jan. 1.

The test focused on a global air-to-ground data link supported by Arinc Inc. in Annapolis, Md.

Corning Names CIO

Telecommunications component manufacturer Corning Inc. in New York has named Richard J. Fishburn as its new vice president and CIO, effective April 21.

Fishburn spent 14 years at Digital Equipment Corp. and most recently served as its CIO.

Serbian News Outlet Shut Down Friday

Serbian government officials on Friday shut down Radio B92, silencing the last independent press outlet in Serbia. The station had been broadcast in English and other languages on the Amsterdam-based Web site *www.xs4all.nl.*

Short Takes

YAHOO INC. agreed to buy **BROADCAST.COM INC.**, a broadcaster of streaming audio and video programming, in a stock transaction valued at approximately $5.7 billion. . . . Push technology pioneer **POINTCAST INC.** in Sunnyvale, Calif., said it was laying off one-third of its 200 workers after a proposed acquisition by telecommunications companies failed. . . . **IBM**, **HEWLETT-PACKARD CO.**, **COMPAQ COMPUTER CORP.**, **SCO INC.** and **SEQUENT COMPUTER SYSTEMS INC.** said they would develop Unix guidelines for computers that have **INTEL CORP** processors. . . . International firms are outperforming U.S. companies in information technology productivity and quality, as well as in several aspects of IT-related human resources, according to a report being released this week by **META GROUP INC.** in Stamford, Conn.

OIL GIANTS' MERGER FACES BIG IT HURDLES

Observers: BP Amoco, Arco may consider not integrating systems

BY STACY COLLETT

BRITISH OIL GIANT BP Amoco plans to save $1 billion by eliminating overlapping operations and combining IT business processes following its $28.6 billion purchase of Atlantic Richfield Co. (Arco).

But industry observers said melding the huge, highly customized information technology systems of British Petroleum (BP), Amoco Corp. and Arco could prove so difficult that it may be wise to let each system stand alone.

The deal, announced last week, is BP's second major acquisition in less than a year. Its $48 billion purchase of Amoco last August raised doubts about the two companies' IT compatibility. Amoco, a staunch SAP supporter, has just completed a massive R/3 implementation. Outsourcing-centric BP also has some Oracle Corp. enterprise resource planning systems. Add Arco's proprietary mainframe systems in the U.S. and Oracle applications abroad, and BP Amoco faces overwhelming technological and political challenges (see chart).

Arco evaluated Oracle and SAP systems late last year but chose to stay with its proprietary systems. "Oracle and SAP both lack the functionality that's in these [homegrown systems]," said Mark Armentrout, Arco's manager of exploration and production IT services in Plano, Texas. And part of at least one Arco division is publicly traded, which makes it more difficult for BP to impose IT policies, Armentrout said.

"It may be cheaper to [stay put] than to try to find the economies of scale around the edges of those systems," said Jim Harrison, head of energy industry consulting at Ernst & Young LLP in Houston.

In fact, the cost of integrating three disparate systems into one can be 10 times greater than the savings it would yield per year, according to Syd Hutchinson, senior consultant at Compass America Inc., an IT performance consultancy in Reston, Va. "Not many companies bite that bullet," he said.

And oil prices that are at rock bottom have put pressure on most oil companies to cut expenses. Arco has laid off more than 100 IT workers since November.

Observers said BP Amoco hasn't decided how, or if, it's going to combine IT systems. But analysts advised that it have a strategy in place before the deal is complete. ◗

When IT Systems Collide

BP — Uses Oracle for downstream applications; outsources accounting and accounting IT to PricewaterhouseCoopers; deals with Andersen Consulting to outsource most other IT operations around the world

AMOCO CORP. — Recently completed massive R/3 implementation

ARCO — Oracle applications abroad, proprietary mainframe systems in U.S.

MOREONLINE

For articles and resources related to information technology and mergers, visit our Web site.

www.computerworld.com/more

MasterCard, Amex Push Online Tracking

Corporate customers to get Internet access to track their line-item spending

BY THOMAS HOFFMAN

The business-to-business electronic-commerce market sizzled last week with competing announcements by MasterCard International Inc. and American Express Corp., who both intend to provide corporate-card customers online access to track their line-item spending.

Finance executives are hungry for those kinds of tools. Their top concern is the lack of technology available to reduce and track operating costs, according to a March survey of 429 chief financial officers and other bean counters. The survey was conducted by the Financial Executives Institute in Morristown, N.J., and Computer Sciences Corp. in El Segundo, Calif.

MASTERCARD'S Steve Abrams says the software lets customers use any electronic procurement system

To help support those needs, Purchase, N.Y.-based MasterCard has teamed up with EC Cubed Inc., a Wilton, Conn.-based electronic-commerce software vendor, to create a "commercial card gateway" that will allow corporate customers to track online every purchase made with their cards using an electronic procurement system.

EC Cubed's ec-Works is the underlying software that will allow MasterCard's corporate customers to track and reconcile all of their purchases regardless of what type of electronic procurement system they happen to use, said Steve Abrams, senior vice president of corporate products at MasterCard.

When the system goes live around July, customers will be able to access MasterCard purchasing data housed in a St. Louis data warehouse through a new Internet connection that MasterCard is creating.

Customers will still be able to analyze the data using dial-up connections and software packages offered by member banks such as Wells Fargo Bank, Citibank and First Chicago NBD Corp., Abrams said.

Abrams declined to specify how much MasterCard is spending on the initiative, nor did he quantify the expected financial returns.

And American Express in New York has partnered with Walnut Creek, Calif.-based Commerce One Inc. to let corporate customers track credit-card purchases via Commerce One's MarketSite.net Web site. The plans call for a feature that will allow card holders to reconcile spending with budgeted amounts. ◗

Intel Aiming Chip for Handhelds

BY MATT HAMBLEN

Intel Corp. last week announced two chips for handheld computers and smart phones that will boost power while conserving battery life.

Samples of the StrongARM SA-1110 and SA-1111 will be available this summer, in time for device makers to use them in new products for the year-end buying season. The chips will save space and conserve power by integrating more functions on a single chip. Analysts said they will be a boon for office workers and consumers who use the devices.

"More than anything, the new chips show Intel's interest in the handheld marketplace," said analyst Jill House at International Data Corp. in Framingham, Mass.

Still, analysts said Intel faces tough competition from similar chips by NEC Corp. and Hitachi Corp. ◗

"At Sony, we installed WebFOCUS at 9:30.

I developed reports myself and put them on the Web by noon."

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WebFOCUS is a powerful Web reporting and analysis system that can access any database and platform, so it was easy to consolidate data. And it's so productive developers were able to put new reports on their intranet in minutes.

Gary Fischer, Data Warehousing Manager at Sony Electronics says, "It gives everyone from senior executives to operational staff the answers they need when they need them."

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IBM LEADS CHARGE TO POST PRIVACY POLICIES

Threatens to pull ads from sites that don't in end-run around feds' regulation efforts

BY DAVID ORENSTEIN

When IBM announced last week that it will no longer sponsor Web sites that fail to disclose their privacy policies, it opened another front in the war against sites that resell personal information collected without permission.

Privacy advocates said IBM is the first major Web advertiser to take that stance. "My expectation is that [IBM] will make a big difference," said Susan Scott, executive director of Truste, a privacy advocacy group in Palo Alto, Calif.

Advertiser pressure is an emerging way to encourage sites to make privacy disclosures, he said. Another strategy has been to persuade Web portals to lead by example. Truste hopes to stave off government privacy regulation.

Effective June 1, IBM won't advertise on sites that don't make it easy for consumers to learn what information might be taken, what will be done with it and how to opt out before it is taken.

Past surveys by the Federal Trade Commission (FTC) and IBM itself indicate that the vast majority of Web sites don't tell consumers what will happen to their personal data. Results of a new FTC survey are expected later this month.

Marjorie Valin, vice president of the American Advertising Federation, a trade group in Washington, said IBM's move will start a ripple throughout the industry. "Whenever a leading company sets a new standard for business practices, it often has a domino effect," she said. "At a minimum, I would expect other major advertisers to study the issue."

Rich LeFurgy, chairman of the Internet Advertising Bureau, a trade group that represents sites that sell Web ads, praised IBM's stance but said a broader movement among advertisers is unnecessary. LeFurgy, who is also chairman of FAST, a broader group of advertisers, said the groups are ensuring that within six months, 80% of their members will make privacy disclosures that satisfy online privacy standards. IBM is on FAST's steering committee. ▸

DID YOU KNOW?

Privacy Policy

- IBM said only 30% of the 350 Web sites where it runs ads in the U.S. and Canada adequately disclose privacy policies.

Is the End of (IBM's) PC Era in Sight?

Gerstner comments spark much debate

BY MATT HAMBLEN

Since IBM Corp. Chairman Louis Gerstner declared to investors that "the PC era is over," the collective eyebrows of the computing world are still raised in wonder.

Was it hyperbole or not?

Some analysts and users said they think Gerstner wasn't talking just about IBM, which endured a nearly $1 billion loss last year in the personal computer sector, compared with gains in software and services.

In a March 24 letter to investors, Gerstner was careful to note that PCs aren't going to die off. But he also emphasized that "the PC's reign as the driver of customer buying decisions and the primary platform for application development is over." What's supplanting the PC is the network, Gerstner said.

Observers said Gerstner was trying to say that the computing world at large is slowly reverting to Internet devices with less functionality than PCs. Perhaps the big PC ship is beginning to turn, and other PC makers had better take heed, some analysts said. "It's not as if the PC is going to go away in the next 12 to 24 months, but his words do send out an interesting message," said Chuck Jones, an analyst at Salomon Smith Barney in San Francisco. "Gerstner's view should give Dell [Computer Corp.] and Compaq [Computer Corp.] pause for sure," said James Pyner, a financial analyst at CIBC World markets in New York. Without strong offerings in servers or mainframes, any vendor's revenue growth will slacken, he said.

Several analysts and users said the idea that Internet and network devices will make inroads on the dominance of PCs during the next two years is up in the air. Network computers announced two years ago haven't caught on, they said.

But analysts agreed that the era of revenue growth for the PC is over. "And that means for everybody making PCs — not just IBM," said Roger Kay, an analyst at International Data Corp. (IDC) in Framingham, Mass. IDC last week estimated that although all PC unit sales in the U.S. will increase 16% this year, revenue will be flat, mainly because of falling prices. In the U.S. there's the added issue of corporate saturation. Revenue will be flat beyond 2002 in the U.S., with the same trend felt worldwide on a lagging time frame, Kay added.

Several financial and industry analysts said it's far too early for corporate PC users to abandon the machines or even to begin evaluating alternatives. Some predicted IBM will outsource more manufacturing of PCs — as it already does with Acer Inc. in Taiwan — rather than abandon the division.

Some of the analysts called on IBM to abandon the division, but others said it made no sense because PCs serve as a "loss leader" to supplement its other service, software and server sales and offer a complete package to users.

Former IBM user Louis Fuentes, information systems manager at the *Daily Journal* newspaper in Vineland, N.J., disagreed that the PC era is over in general — but said it should be for IBM. ▸

THE VIEW FROM LOU

"The PC era is over. *This is not to say that PCs are* **going to die off**, *any more than mainframes* **vanished** *when the IBM PC debuted in 1981. Indeed, IBM's own PC business was an* **important turnaround story** *in 1998. But the PC's reign as the* **driver** *of customer buying decisions and the* **primary platform** *for application development is over. In all those respects,* **it has been supplanted** *by the network."*

LOUIS V. GERSTNER JR., IBM CHAIRMAN AND CEO, IN A LETTER TO INVESTORS

Survey: ERP Costs More Than Measurable ROI

BY CRAIG STEDMAN

ERP projects typically cost users more than they pay back in measurable financial benefits, according to a survey released last week by Meta Group Inc.

The survey of 63 companies with enterprise resource planning (ERP) systems turned up an average negative value of $1.5 million when quantifiable cost savings and revenue gains were balanced against spending on hardware, software, consulting and support, Meta Group said.

That doesn't mean users should just say no to ERP, said Barry Wilderman, an analyst at the Stamford, Conn., consulting firm. The software can help deliver important, intangible benefits such as better customer service, and it's a key foundation for high-payback applications such as supply-chain planning, he added.

But users proposing ERP investments need to make clear to executives that a quantifiable return may not be in the cards "or else you're going to get killed," Wilderman said.

The findings square with the experience of Green Mountain Coffee Inc. in Waterbury, Vt., which has used a PeopleSoft Inc. ERP system since 1997.

"If you scratched out on a piece of paper what the financial impact has been, you'd probably come up with a negative number," said Green Mountain CIO Jim Prevo. "But I think without a doubt you'd find people agreeing it was the right thing to do."

Green Mountain used the ERP system warehouses in areas where it was shipping via delivery services. This month, it plans to launch an extranet that lets buyers order online. The moves should cut costs and improve service, but quantifying the second half of the equation "is a tough thing to nail," Prevo said. ▸

JUST THE FACTS

ERP Averages

Meta Group's survey found these averages for ERP projects:

Time to implement: 23 months

Implementation cost: $10.3 million

Total cost of ownership: $15.6 million

Net present value: minus-$1.5 million

Base: Written survey and follow-up interviews with project managers at 63 companies worldwide that use enterprise resource planning software

SOURCE: META GROUP INC., STAMFORD, CONN

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BRIEFS

Inprise CEO, CFO Exit Abruptly

Inprise Corp. CEO Del Yocam and Chief Financial Officer Kathleen Fisher abruptly resigned last week, in what Dataquest analyst Larry Perlstein characterized as a power struggle related to the potential sale of the company.

The application-development tools company is now being run by a committee of other officers. An Inprise spokesman declined further comment.

Linux Accelerates To Top Growth Spot

Linux, the open-source variant of Unix, will be the fastest growing operating system through 2003, predicted a study by International Data Corp. in Framingham, Mass. Commercial shipments of the server operating system are projected to grow by 25% per year.

IBM, Dayton Hudson Ink Outsource Deal

Dayton Hudson Corp. and IBM last week announced a five-year, $400 million outsourcing contract under which IBM will take over the retailer's mainframe operations and mainframe systems support. Dayton Hudson said 75 information technology workers will become IBM employees under the arrangement. Dayton Hudson operates more than 1,100 department stores nationwide.

Short Takes

AVON PRODUCTS INC. named former General Motors, Europe, CIO Sateesh Lele as its new CIO. Avon President Charles Perrin said Lele will help Avon expand several initiatives, including e-commerce. . . . The **STATE OF LOUISIANA** awarded **NICHOLS RESEARCH CORP.** in Huntsville, Ala., a $13.4 million contract to implement human resources and payroll software from **SAP AG.** . . . **COMPUTER SCIENCES CORP.** received a $6.9 million contract to modernize the **U.S. COAST GUARD**'s military pay and personnel system using **PEOPLESOFT INC.**'s applications.

Sun, Netscape To Merge Some Server Lines

Migration details lacking, users say

BY STEWART DECK
AND CAROL SLIWA

The alliance between Sun Microsystems Inc. and Netscape Communications Corp. debuted last week with sketchy plans for combining the companies' enterprise server software products.

Users and analysts reacted to the first wave of announcements from the Sun/Netscape Alliance with wary interest and sought more details about the migration paths for the merged product lines.

Netscape — which America Online Inc. recently purchased for $10.2 billion — will work with Sun to develop and market enterprise server software for messaging, applications, security, management and directory services. The alliance also will offer consulting and implementation services.

The strategic plan hit a day before AOL announced the layoff of 850 employees. Cuts primarily came from AOL's technology department and Interactive Services division and Netscape's Netcenter staff, an AOL spokesman said.

Road Ahead

Sun/Netscape product details were less concrete, but officials provided the following technology road map:

- The merged directory, security and management servers will be based primarily on Netscape's directory product.
- Separate Sun and Netscape messaging server upgrades will be released later this year, but a merged version is due out by March 2000.
- Similarly, the alliance will sell the latest application servers from Sun and Netscape and then combine them for a joint release early next year.

Rick Waugh, a systems analyst at BCT.Telus Inc. in Burnaby, British Columbia, said he's concerned about which company's technology will be emphasized in the Alliance Messaging Server.

Sun's Internet Messaging Server seems geared more for Internet service providers, and the Netscape mail server is tailored to corporate messaging, Waugh said. "So I'm hoping they don't lean too far in the [Internet provider] direction," he said.

Waugh said he's concerned about the Alliance Directory Server. "It sounds like they're throwing everything but the kitchen sink in the directory. At what point it stops scaling, and becomes a bottleneck, becomes a little bit worrisome," he said.

The alliance "is a wonderful, whiz-bang idea that will try to outgun IBM and Microsoft," said Scott Smith, an analyst at Current Analysis Inc. in Sterling, Va. "But it's kind of a Yugoslavian alliance that pulls together lots of people who used to compete. Actually implementing it will be difficult. They gave very few details about how it would function operationally," Smith said.

The real devil is in the details.

For instance, integrating Sun's and Netscape's application servers will be a technical challenge, said Mike Gilpin, an analyst at Cambridge, Mass.-based Giga Information Group Inc.

Though the vendors said they will provide a migration path to ease the move for customers, that isn't easy, Gilpin said. "I think there's no way that all of those things could be done by Q1 2000," he said. ◗

AT A GLANCE

Alliance Plans

The Sun/Netscape Alliance's development plans include:

Application server: Will develop and market new versions of both Sun and Netscape application servers. Will merge the two in a single product, to be released by March 2000

Messaging server: Separate product lines until the release of a merged product by March 2000

Directory/security server: Merged products will be based primarily on Netscape technology. Due in second half of this year

Enterprise Web server: Alliance version due by March 2000

STATES PUT SPAM UNDER ATTACK

But experts see potential for conflicting laws

BY PATRICK THIBODEAU
WASHINGTON

THE U.S. Congress' failure to adopt nationwide antispam legislation is prompting a grassroots movement among states to do the job.

Virginia last week became the fourth state to enact antispam legislation; 19 other states are considering it. But there's debate about whether a state-by-state approach is appropriate.

Virginia Gov. Jim Gilmore signed a package of high-tech legislation, including a law that sets criminal penalties for forging addresses and using third-party servers to relay spam. California previously passed similar legislation.

Spam is usually considered a problem only for consumers and Internet service providers, but it also affects corporate users. Virginia Power, a Richmond, Va.-based utility, was victimized last year by someone who used its server to relay spam.

The incident didn't burden the utility's network, but the company was concerned about its effect "on our relationship with the rest of the business community," said Michael Lindsey, director of data processing.

Once a mass mailing is relayed through a company's server, its name appears in the header.

Spam jeopardizes legitimate electronic commerce, said Mark Bugeaud, director of corporate Internet development at General Motors Corp. in Detroit, who said antispam legislation may be needed.

"We're taking a valuable resource and we're squandering it with junk," he said.

But Susan Vik, director of information technology services at Harvard Law School, said she would prefer technology fixes, such as filtering tools and self-regulation. The problem with any spam legislation is determining just what is "unwanted," Vik said.

Internet service and e-mail providers have been the strongest advocates for legislation. The best solution is national antispam legislation, said Randy Delucchi, director of operations services at Hotmail, Microsoft Corp.'s free e-mail service.

"This would prevent a crazy quilt of well-intentioned but conflicting state legislation," he said.

Experts Divided

Legal experts are divided on the effectiveness of state-by-state efforts. "I think there is going to be some troubling jurisdictional questions," said Walter Effross, a law professor at American University in Washington.

How, he asked, does someone know whether a spam e-mail is going to someone in Virginia?

But Robert Webb, an attorney at Hazel and Thomas PC in Fairfax, Va., said state actions such as Virginia's can be effective. "It's a first step. Somebody has to do something to outlaw this fraudulent activity," he said. ◗

JUST THE FACTS

Attacking Spam

An update on antispam bills:

- **Washington, Nevada, Virginia and California have passed antispam legislation**
- **19 other states are considering antispam measures**
- **Eight antispam bills were introduced in Congress last year; all failed**

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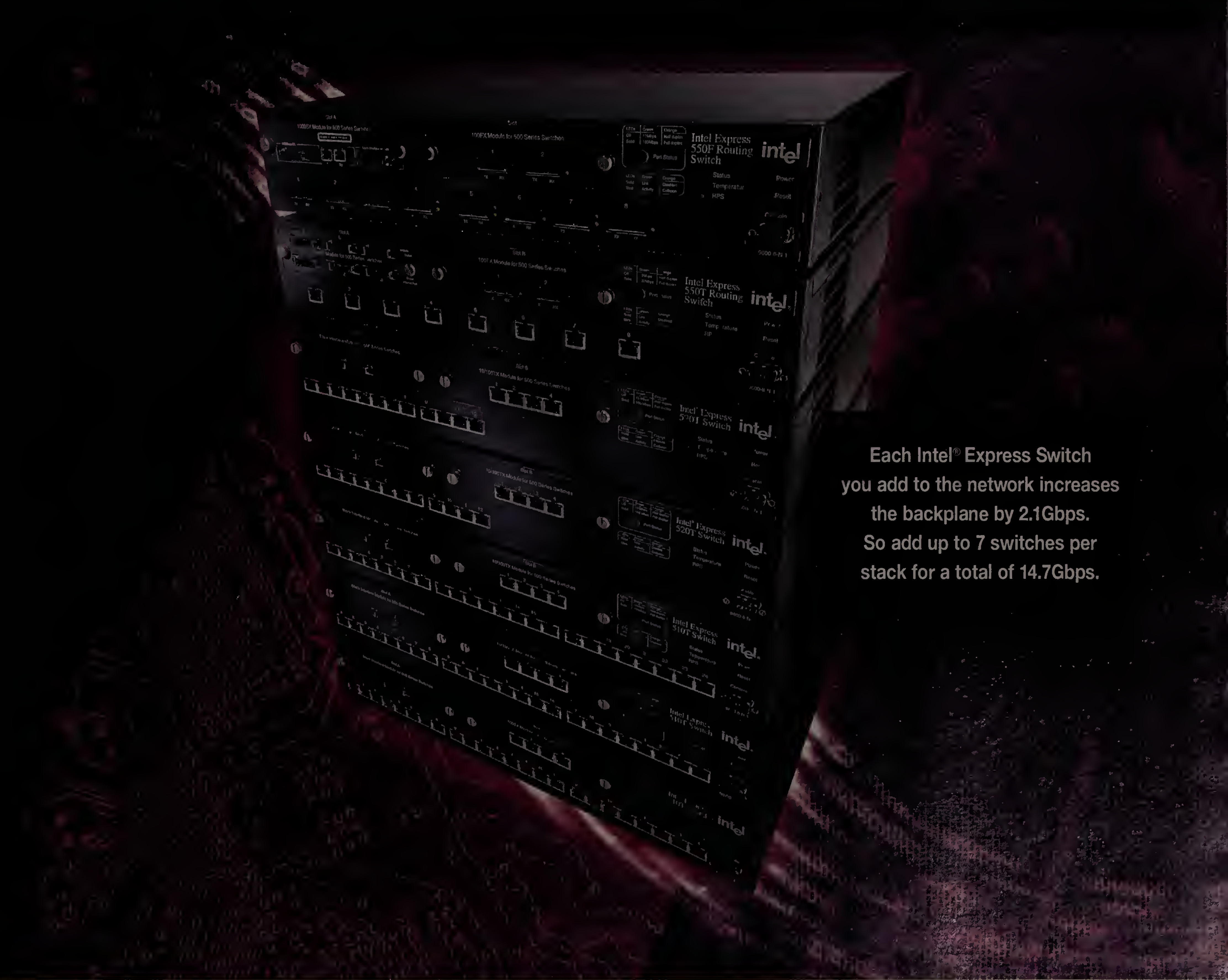
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In Turnaround, Microsoft To Make Windows 95 Fully Year 2000-Compliant

BY KIM S. NASH

In the wake of customer confusion and inquiries about the year 2000-readiness of Windows 95, Microsoft Corp. last week acknowledged it will issue a patch next week that will make the operating system fully compliant.

The move comes after computer services giant Electronic Data Systems Corp. (EDS) insisted it was told by Microsoft to migrate from Windows 95 to Windows 98 to ensure that year 2000 wouldn't interfere with the performance of EDS's desktop applications [CW, March 29].

Microsoft denied it gave EDS such advice.

Two weeks ago, in an interview with *Computerworld*, Microsoft characterized Windows 95 as "compliant with minor issues."

That means it will have some problems parsing dates after 1999, but nothing that will cause data loss or systems crashes, according to Microsoft (see *www.microsoft.com/technet/year2k* for a list of the issues involved).

At the same time, Microsoft year 2000 product manager Don Jones also clearly stated that Microsoft wouldn't make Windows 95 fully year 2000-compliant [CW, March 29].

Change in Position

But in an apparent about-face, the vendor next week plans to release a patch for those problems, making the product fully compliant.

Microsoft will also commit to ensuring a 100%-compliant status for Windows 95 through Jan. 1, 2001, Jones said.

The free patch will be available at Microsoft's Web site, but the exact Web address was unavailable at press time.

Microsoft "will resolve any issue that's found," Jones promised. "If customers report any issues, we have 3,500 testers here ready to address them."

No Glitches Expected

Jones added that he expected no glitches to be uncovered once the patch is applied.

"It's not a major problem for us because we do our own systems testing," said Pat Blair, a systems administrator at Peet's Companies Inc. in San Francisco.

"The contradictions coming out of Microsoft, though, sure get annoying," Blair said.

Jones said he received more than 100 inquiries from customers, analysts and Microsoft field staff about Windows 95's year 2000 status after the EDS situation came to light last Monday.

Microsoft testers signed off on the readiness of the patch late Thursday night, he said. ▶

Senior editor Sharon Gaudin contributed to this report.

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ANTITRUST VERDICT COULD COME IN 2000

Trial resumes in May; unless Microsoft/DOJ settle, outcome could take years to hit users

BY PATRICK THIBODEAU
WASHINGTON

THE TWO SIDES in the Microsoft Corp. antitrust trial appear to be making an effort to settle the landmark case. Government attorneys weren't happy with Microsoft's initial offer, but the parties agreed to continue a bargaining process that started last week.

Microsoft also began settlement talks last week with Sun Microsystems Inc. to try to end the legal dispute over Microsoft's changes to Sun's Java programming language. In the U.S. District Court case in San Jose, Calif., the judge advised the companies several months ago to try to settle. In the government antitrust case, if the two sides don't settle during the current court recess, the trial won't resume until May 10 at the earliest.

According to a timetable set last week by Judge Thomas Penfield Jackson, a verdict may not arrive until year's end or early next year.

For technology users, that timetable would mean that any impact from the case — after appeals are exhausted — could be several years away.

If that happens, said Joe DiBenedetto, MIS director at J&R Music and Computer World Inc. in New York, the public will lose interest, and the case will lose relevance to businesses.

DiBenedetto said he wonders if antitrust laws can even apply to the computer industry. "While not allowing one company to have a monopoly is a noble thing," in the end, users have to consider whether they are getting a "worthwhile product," he said.

But Shaun Cleary, a network administrator at J. C. Bamford Excavators Ltd., a construction equipment manufacturer in Staffordshire, England, said the case should proceed. "If Microsoft believes its practices to be fair, then it should continue to defend itself," he said.

The government is considering a broad range of remedies in the case, including the breakup of Microsoft and the forced licensing of its Windows source code. A report in *The Seattle Times* last week said Microsoft was willing to discuss how it handles application programming interfaces in an effort to settle. Microsoft wouldn't comment.

Microsoft and government attorneys agreed last week to keep their talks secret, a sign the negotiations are serious.

Flanked by attorneys from a number of states, David Boies, the lead government attorney, said that when it comes to confidentiality, the parties "are of [a] single mind." Boies' comments followed a two-hour meeting with Microsoft officials. ◗

Senior editor Kim S. Nash contributed to this report.

Raytheon Works with ISPs In Hunt for Accused Traitors

Company unyielding in claims of wrongful chat by employees

BY KIM S. NASH

Aerospace firm Raytheon Co. continues to hunt for the identities of employees who allegedly posted disparaging comments about the company at a Yahoo Inc. chat board.

After issuing a subpoena to Yahoo early this year to turn over all personal information it had on the posters of 21 messages, Raytheon has contacted America Online Inc., EarthLink Network Inc. and other Internet providers to try to track down who said what.

Raytheon in February filed a lawsuit against the "John Doe" message posters, charging them with revealing confidential company information. The posters used aliases on Yahoo.

Neither Raytheon in Lexington, Mass., nor Yahoo in Santa Clara, Calif., would say last week what kind of information was revealed and how it hurt the company. However, a published report cited chatty posts advising others not to buy Raytheon stock, for example, because of accounting and sales problems at the company.

Loose chat on Yahoo and other popular Web sites has irked lots of companies trying to protect their reputations on the Internet. Comments can range from legitimate consumer gripes to erroneous and damaging rants [CW, July 20].

"Any large company is going to have a lot of muck out there," said Brandy Thomas, CEO of Cyveillance Inc., a company in Alexandria, Va., that monitors Web sites for harmful information or unauthorized use of logos and brand names. But the key is picking your battles.

Unlike Web sites selling knock-offs of a company's products or misusing trademarks, hurtful chat is fleeting. "Think of all the effort they've gone through ... to sue a bunch of John Does" whose real identities may or may not be exposed, Thomas said.

In Raytheon's case, most of the comments are thought to be from employees and not dissatisfied customers.

By suing, Raytheon didn't intend to quell freedom of speech among its employees, a spokesman maintained. The suit, which is still pending, was "necessary to protect the company's proprietary information from being published in a public place," he said. ◗

E-Gossip Monitors

Several companies now monitor Internet activity for potentially damaging or incorrect information about their clients:

COMPANY	URL
EWatch (White Plains, N.Y.), division of WavePhore Inc.	www.ewatch.com
CyberCheck Internet Intelligence (Arvada, Colo.)	www.cycheck.com
Cyveillance Inc. (Alexandria, Va.)	www.cyveillance.com
Ogilvy Public Relations Worldwide (New York)	www.ogilvypr.com

Microsoft's Ballmer Details Reorg

Computerworld editor in chief Paul Gillin interviewed Microsoft Corp. President **Steve Ballmer** via e-mail last week about what's behind the company's latest reorganization (see story, page 28).

PRESIDENT STEVE BALLMER: Expects teething trouble

Q: What changes will customers actually see?

A: Hopefully they'll see that the way we interact with them maps much more closely to the way they think about how their own businesses operate. But clearly, it will take a little time for the effect of all the changes to permeate through the entire organization.

Q: You and Microsoft Chairman and CEO Bill Gates said last week that the new business unit leaders are "empowered to drive product planning and marketing strategies." How is this different from before?

A: This reorganization will give them even more freedom to run their own businesses — each of which are the size of large stand-alone companies. The net result should be that we can adapt to the changing needs of our customers even more quickly.

Q: You've said that you want to delight the customer. Where were you *not* doing that?

A: It's clear that some of our customers have been unhappy with some aspects of the quality and ease of use of our software, with the service we provide them and with an organization that many of them felt could have been more adept at meeting their needs. This reorganization will hopefully go a long way toward addressing those shortfalls.

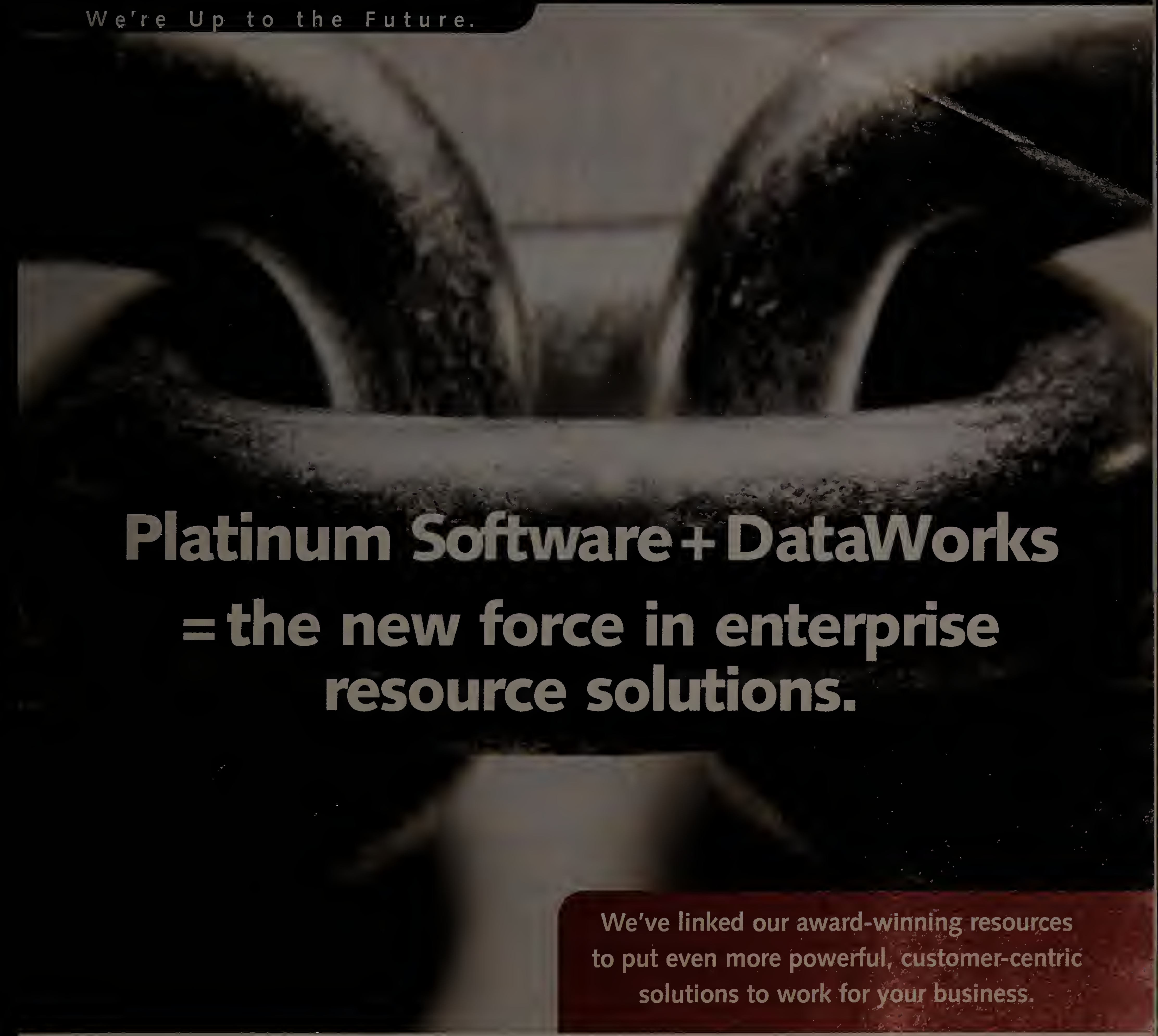
Q: You're consolidating Windows products under one operating system kernel, yet product management will be distributed among more than one group. How do you expect to maintain consistency?

A: This goes to the heart of the reorganization. In the past, the company was structured purely along product lines, which meant that a major part of Microsoft was organized entirely around Windows.

But that didn't reflect the reality of the marketplace, where Windows has several very distinct and very different kinds of customers: the enterprise itself, knowledge workers and consumers. If we address the needs of customers, I don't think consistency will be a problem.

Q: How many customers will require significant preparation in migrating from Windows 9x to Windows 2000?

A: Migrating to any new operating system means a lot of preparation by customers, and there are bound to be some teething troubles. We're working hard to minimize compatibility issues, and by the time the OS launches, we obviously aim to have them solved for all but the most arcane applications. ◗



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SUSPECT ARRESTED AS MELISSA VIRUS MUTATES

Corporations put mail servers on alert, reassess, deploy defensive strategies

BY ANN HARRISON

AUTHORITIES last week arrested David L. Smith of Aberdeen, N.J., and charged him with creating the Melissa virus.

Smith faces several charges, including interruption of public communications, a second-degree felony; and theft of computer services, or wrongful access to computer services, both of which are third-degree felonies. Smith was released on $100,000 bail and could face federal charges.

Companies hit by the Melissa virus last week are reassessing their defensive strategies and bracing to resist variants that use existing viruses as road maps to deliver potentially destructive payloads.

As mutant viruses continued to invade corporate networks, some security analysts blamed Microsoft Corp.'s insecure macro architecture for making users especially vulnerable (see related story below). The viruses forced scores of Fortune 1,000 companies, including Intel Corp., Lockheed Martin Corp. and Microsoft, to shut down their e-mail servers last week.

To limit damage and bring systems back online, many companies resorted to rapid response strategies, such as blocking incoming mail attachments and rapidly updating antivirus programs.

Those using desktop management systems, such as the Total Virus Defense suite from Network Associates Inc., the Systems Management Server tool from Microsoft and Tivoli Enterprise Solution from Tivoli Systems Inc., had the edge in automatically distributing antivirus tool updates to individual desktops.

Separately, security experts are recommending that companies encrypt proprietary files as a guard against inadvertent remailing during virus infections and train employees to avoid opening attached files of unknown origin. They also recommended using several antivirus products to disinfect servers because certain products may not be updated for various mutations.

Melissa is a macro virus launched when a user opens an infected Microsoft Word document sent as an e-mail attachment (see FAQ, at right).

Ken Poteracki, an information security administrator at Aon Inc., a Chicago insurance brokerage, said that when his company detected the virus, it immediately updated virus protection files on its Lotus Notes server. That server handles 85% of the company's worldwide e-mail.

Poteracki said he's still concerned that virus authors will find new intrusion pathways. "These guys are getting more and more clever, and they try to stay one step ahead of everyone else. We need to hire some of these people," he said.

Melissa hit Lockheed Martin in Bethesda, Md., March 26. To prevent the virus from propagating, said Elaine Hinsdale, manager of communications at Lockheed Martin Enterprise Information Systems, the company prioritized its response: first containing the virus, then cleaning desktops, installing updated scanning and filtering tools, and then re-establishing internal, and finally external, e-mail access.

"We are getting ready for year 2000, and the same [type of] crisis-management teams need to be in place [for antivirus measures] so that you can respond to any outages that occur," Hinsdale said. ◗

Online reporter Kathleen Ohlson and IDG News Service writer Nancy Weil contributed to this article.

MOREONLINE

For virus resources such as FAQs, publications, product overviews, hoax and virus listings, visit our Web site.
www.computerworld.com/more

FAQ: Melissa Virus

What is it? Melissa is launched when a user opens an infected Microsoft Word 8 or Word 9 document contained in either Office 97 or Office 2000.

How is it spread? It prompts Microsoft's Outlook e-mail program to send an infected document to the first 50 addresses in the Outlook address book. Even if the user doesn't use Outlook, the virus can infiltrate the default Word document template, "Normal.doc," and send the virus to anyone receiving the user's Word documents. The virus also attacks the Word 97 registry and changes security settings that prevent the Word macro warning from appearing.

How do you recognize it? The original virus was sent via e-mail with the subject line "Important Message From . . ." and then automatically filled in the user's name. The text inside the message reads "Here is the document that you asked for. Don't show anyone else ;-)." The message includes an attached list of pornographic Web sites called "list.doc."

How is Melissa mutating? A variant, called W97M_MELISSA.A, appears with a blank subject line, defeating a popular patch from sendmail.com, which scans for a subject header.

– Ann Harrison

Virus Forces Look at Microsoft's Approach to Security

System of macros seems particularly vulnerable to network hacks

BY KATHLEEN OHLSON

As the Melissa virus and its mutating offspring continue to wreak havoc with computer systems, some security experts are blaming Microsoft Corp. for not protecting its customers enough.

Melissa and its variants have taken advantage of macros in Microsoft software, namely Outlook and Excel, using those access points to overload and crash many corporate mail servers. Microsoft products are a popular hacking target.

Microsoft defines macro as "a piece of programmable software code" that allows users — through its Visual Basic language — to customize applications such as Microsoft Office.

But that functionality is a "double-edged sword," said one security consultant. It's useful that applications can be modified quickly and easily, but there's "the potential for unlimited harm," said Fred Cohen, a security consultant at Fred Cohen & Associates in Livermore, Calif.

Macros create a security hole, such as dropping in file fighters to open a network connection, said Raul Elnitiarpa, a software engineer at Symantec Corp.'s Antivirus Research Center in Santa Monica, Calif.

"We provide [security] features, and if users take advantage of them, they will be protected from malicious hackers," said John Duncan, a product manager for Microsoft Office. "Microsoft also encourages users to run antivirus software and not accept macros they're not familiar with."

Microsoft has also introduced application programming interfaces that allow any antivirus product to be integrated into Office, he added.

But Microsoft's approach is "not well thought out," said Weld Pond, a member of the hacker group Lopht. "They usually present the user with an all-or-nothing approach to security," and if it's between ease of use and security, users will pick the former, Pond said.

Though Microsoft says it solved Melissa with the warning box, that isn't enough because the virus is widespread, Pond said. "They really need to build a security model into the macro language," he added.

Most vendors face similar security threats, Pond said. Netscape Communications Corp. was one of the companies hit with an e-mail attachment buffer overflow problem last fall, he noted. "Microsoft is no better or worse than the rest." ◗

FAQ: The Papa Variant

What is it? Papa is similar to Melissa except that it's delivered via mailed Microsoft Excel documents.

How is it spread? It mails itself to the first 60 people on multiple address books every time the virus is activated.

How do you know you have it? The Papa virus sends pings, or network queries, to an undisclosed, external site. This consumes large amounts of bandwidth, which can crash corporate networks.

Are there Papa variants? The original Papa virus lacked the ability to replicate. A variant, Papa.b, which works in the same fashion as the original, Papa.a, can replicate and has surfaced on corporate networks. It has also been modified to avoid detection with Papa.a patches. Papa.b makes copies of itself using Outlook and other address books.

– Ann Harrison

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BRIEFS

AT&T Wins Contract For McDermott IT

AT&T Solutions has landed a 10-year, $600 million outsourcing deal with energy services company McDermott International Inc. The deal covers all of McDermott's IT infrastructure worldwide, including about 10,000 desktops, 350 servers and LANs, and network management at 60 sites.

U.S. Hospitals Claim To Be Y2K-Ready

The American Hospital Association last week said the vast majority of U.S. hospitals will be year 2000-compliant by Jan. 1, 2000. According to a survey of more than 500 member hospitals, fewer than 1% of respondents expect noncompliance with possible adverse effects.

E-Tax Filings Up, But Paper Rules

The number of federal tax returns filed from home PCs has shot up 156% this year, compared with the same period last year, the Internal Revenue Service said last week. About 1.7 million returns were filed from home PCs through March 26. But nearly 63 million returns have been filed, meaning a huge majority of filers still use paper.

Short Takes

COMPAQ COMPUTER CORP. this week will announce Version 5.0 of its Tru64 Unix, which features mainframe-like dynamic partitioning and clustering capabilities. . . . **NOVELL INC.** said its directory-enabled Novell Clustering Services for NetWare 5 is now in open beta. . . . After much-publicized delays, **LOTUS DEVELOPMENT CORP.** last week shipped Release 5 of its Notes groupware, Domino servers and Domino Designer product. . . . **CABLE & WIRELESS PLC** has sued **MCI WORLDCOM INC.** for allegedly violating the terms of the 1998 deal under which C&W bought MCI's Internet business for $1.75 billion. MCI disputed the charges. C&W said MCI WorldCom failed to transfer its Internet customer base, among other charges.

Continued from page 1

CA/Platinum

said. "The knock on CA in the past is that they acquire companies for their revenues and let [the other companies'] products wither."

Senior CA officials said they will detail product and integration plans after the deal closes, possibly in a few months. "We don't know what will happen to specific products," said Yogesh Gupta, CA's senior vice president of product strategy. He added that there's "hardly any" product overlap between the two vendors.

Indeed, CA users seemed to see the megadeal as a wise move because it would give the company much-needed database administration tools as well as products in electronic commerce, data warehousing and application development. CA would also pick up Platinum's 1,000-person consulting services group.

"I see this as a major plus because it combines the best of both worlds, [as] CA is very strong in systems management, while Platinum is very strong in application development," said George Kurtz, senior director of systems architecture at Yellow Services, a sister company to Yellow Freight System in Overland Park, Kan. The company uses 30 CA products and Platinum's application development products.

Worries Aplenty

Yet users of both companies' products expressed concern about the potential for higher licensing fees and diminishing competition from continuing industry consolidation. In addition, comments from senior CA and Platinum officials strongly hinted at layoffs and potential management departures on the Platinum side. The notion that CA would keep many Platinum staffers outside its professional services group and a minority of sales and research and development staff "isn't realistic," said Melissa Eisenstat, an analyst at CIBC Oppenheimer in New York. Platinum employs about 5,000 worldwide.

Platinum customer James Rice, who also uses CA's Unicenter software, said he is worried about continuing support. CA "has a reputation for destroying competitors' products" it acquires — such as Ingres from Ask Computer Systems Inc., said Rice, a database administrator at Manpower Inc. in Milwaukee.

CA'S YOGESH GUPTA: "We've never left customers in the lurch"

But one CA user applauded the vendor's efforts to bulk up its 3,000-person consulting group with Platinum's 1,000-person unit. "The issue is services, because CA does not have enough people to [install] all its products," said Erv Barnes, CIO and vice president of information technology at Exide Electronics Group Inc. in Raleigh, N.C., a big Unicenter user.

Gupta cited Platinum's consulting group as a top reason for the acquisition, noting that the company started from zero early last year in that area and now boasts a 3,000-person global unit.

CA made a failed bid last year to buy Computer Sciences Corp. to further boost that business.

CA needs to improve its software support, according to a recent *Computerworld* survey [CW, March 15], in which CA finished last behind IBM, Oracle Corp., Novell Inc. and Microsoft Corp.

Last week, CA also enacted a global hiring freeze to keep jobs open for Platinum employees. Experts said it's a good bet that the latter's consulting staffers will be most aggressively recruited to stay.

"The Platinum consulting people are very valuable, and I expect CA to grab as many as they can get," said Paul Mason, an analyst at International Data Corp., a consulting and research firm in Framingham, Mass. ▶

Continued from page 1

Motts' ERP Step

should help speed up deliveries to customers and save $2 million per year through better forecasting and planning, said Jeff Morgan, vice president of information technology at Motts.

Motts also is beefing up its SAP R/3 ERP system so that senior executives and financial analysts can better measure how different products affect profits and adjust budgets and priorities accordingly.

The company is customizing R/3 to add basic profit-analysis tools, which Morgan said should be ready later this month. It may also be one of the early users of new business-analysis software that SAP plans to start testing by midyear, he added.

If you get [demand forecasts] right, everything downstream benefits.

AL ENNS, MOTTS NORTH AMERICA

Motts used its $10 million R/3 project to chop IT support costs, reduce its head count and install a single corporate system, Morgan said. Now it needs to improve business planning "more as a matter of routine than as a big exercise that buries you in mounds of spreadsheets," he said.

[Motts needs to improve business planning] as a matter of routine.

JEFF MORGAN, MOTTS NORTH AMERICA

That's a place "where a lot of companies want to go," said John Bermudez, an analyst at AMR Research Inc. in Boston. "But most don't have the groundwork done that would let them get there."

Surrounding an ERP system with advanced planning tools and getting them to work together can require big changes in the way companies are organized and how they deal with customers, Bermudez said.

Motts, which is spending another $2 million just to install SAP's supply-chain tool, is no exception.

Responsibility for demand forecasting is being moved from sales to a new supply-chain planning group that also handles production and distribution scheduling. Training was needed on both SAP's software and general forecasting techniques, said Al Enns, vice president of the new group.

But the potential for improving customer service is a big lure, Enns said. For example, Motts expects to be able to decide on the fly which manufacturing plant could best fill an order "rather than just allocating customers to one plant and leaving them there," he said.

The SAP-generated demand forecasts also should be much more sophisticated than the very simple ones that now come from sales, Enns said.

"And that's the key piece of information for managing the whole supply chain," he said. "If you get it right, everything downstream benefits. But if you get it wrong, everything suffers." ▶

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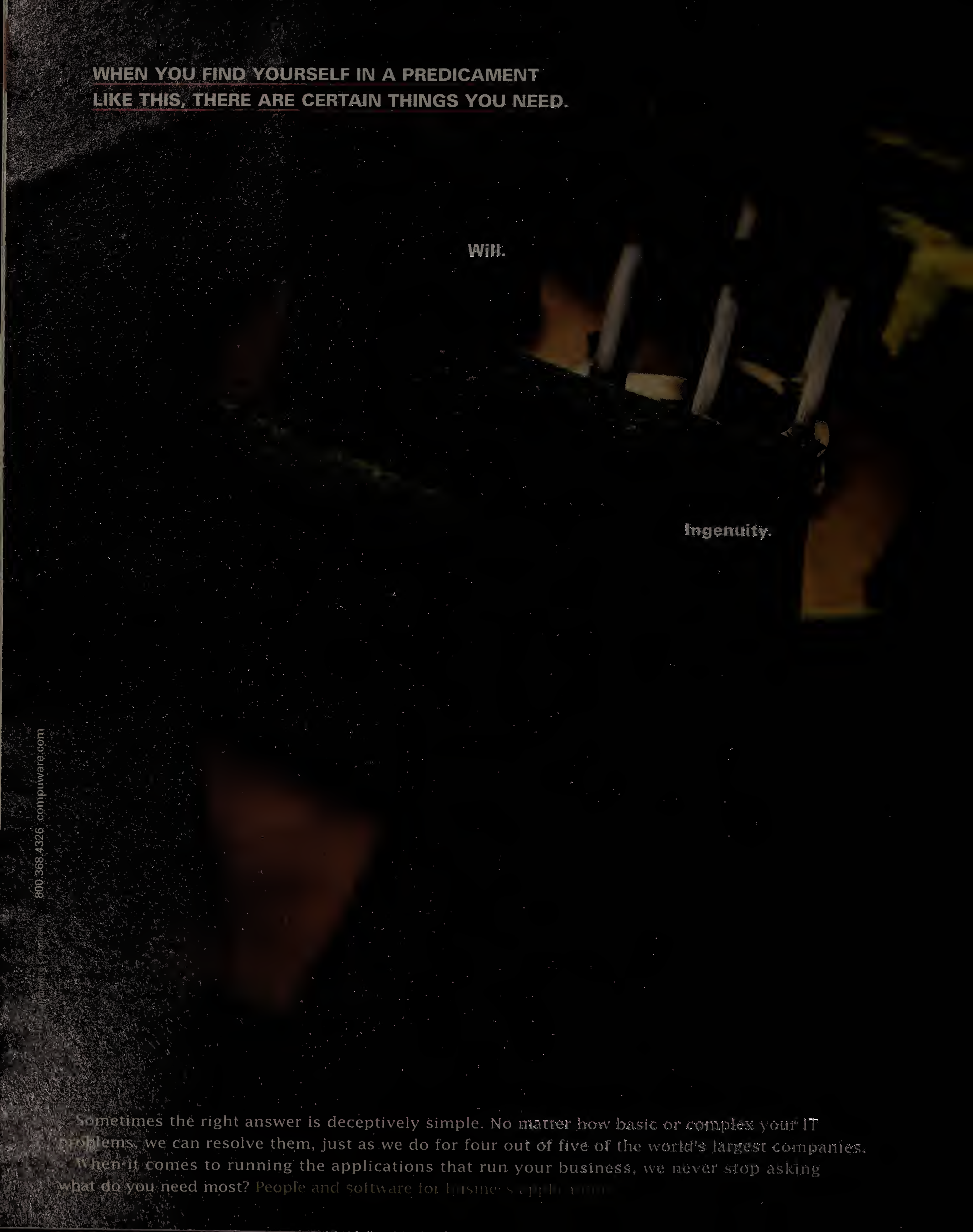

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WHAT'S IT TAKE TO MIGRATE DESKTOPS TO WINDOWS 2000?

ANALYSIS: *Incompatibility woes may persuade corporate users to delay $1,700-per-client upgrade until they buy new PCs*

BY CYNTHIA MORGAN

USERS LOOKING to migrate their Windows 95 desktops to Windows 2000 Pro could end up spending nearly $1,700 per client. That's because acceptable Windows 2000 Pro performance requires more PC power than typical corporate Windows 9x desktops can deliver.

That steep migration curve will probably keep information technology managers from making wholesale migrations to Windows 2000 Pro on the desktop; it's more likely that small groups of users will migrate to the new operating system as they receive new PCs.

Windows 9x to Windows 2000 isn't just a simple upgrade; it's a move to an entirely new operating system with different file and registry structures, file locations and system operations. Using a typically equipped Windows 95/98 Pentium-based PC, *Computerworld* staff experiences with the first two beta versions using Microsoft Corp.'s own documentation revealed incompatibility issues ranging from insufficient memory and hard-drive space to Windows 2000 setup routines that fail because of incompatible drivers.

> As such, for most Win 9x clients the most cost-effective route to Windows 2000 may be simply replacing the machine.

It's clear that many corporate desktops will require substantial hardware and software upgrades. All will require significant technical labor, not to mention pre-rollout testing, to upgrade. As such, for most Windows 9x clients, and certainly for those that are more than 2 years old, the most cost-effective plan for Windows 2000 may be simply replacing the machine.

By comparison, migrating Windows NT 4.0 machines to Windows 2000 will be relatively painless. For example, although Windows 9x architecture has maintained compatibility with a legacy of MS-DOS and Windows 3.x hardware and software, Windows NT-class operating systems have no such requirement.

Customizing a Chore

Migrating Windows 95 desktop clients to Windows 2000 Pro will require that IT managers resolve numerous hardware and software compatibility problems. To drive the point home, Windows 2000's setup routines detect potentially incompatible device drivers, applications and hardware and will suspend installation until each offending component is either removed or updated.

Because homogeneity is rare in corporate networks, IT managers will likely have to provide custom upgrade procedures for each desktop. It also means the bulk of Win 2000 desktop migration money will likely be spent on technical labor such as manually updating each machine or building active setup executables that automatically redirect and reinstall applications when users first log on.

Compatibility with networking and security probably won't be as much of a problem. Users can correct them with relatively simple administration tools they would probably expect to use anyway.

Desktops will need at least 64M bytes of RAM to run acceptably in the typical user scenario, which operates eight to 10 applications and keeps at least four of them open on the desktop at all times.

Windows 2000 Pro will take at least 75% more disk space than Windows 9x, and if you're planning to add newer applications such as Microsoft's Office 2000 to take advantage of new Windows 2000 features, you'll need even more. Given the cost of the upgrades and falling PC prices, the safest migration path for older PCs will simply be replacement. ◗

Migration Setup and Costs*

Do you need to upgrade your desktop PCs?

	TYPICAL PC HAS:	WIN 2000 NEEDS:
Operating system	Windows 95/98	Windows 2000 Pro
Processor	Pentium 200- to 266-MHz	Pentium II or better
Memory (RAM)	24M bytes	64M bytes
Storage memory	6G bytes	6M bytes
Video card	4M bytes	4M bytes
Other	CD-ROM drive; 10M bit/sec. Ethernet; 8 to 10 office applications	CD-ROM drive; 10M bit/sec. Ethernet; 8 to 10 office applications

How much will it cost to upgrade?

	BEST CASE	WORST CASE
Cost to upgrade	$189 per PC	$1,681-plus per PC
Labor to upgrade	20 minutes per PC	5 hours per PC

* BASED ON INFORMATION FROM MICROSOFT AND REVIEWER'S EXPERIENCE WITH BETA 2 OF WINDOWS 2000

The Win 9x-to-Win 2000 To-Do List*

APPLICATIONS

Tasks: Remove all Windows 2000-incompatible components; upgrade components where possible; buy new where necessary; reinstall all existing applications or purchase/develop scripts or programs to manage migration automatically.

Purchases: Download or buy compatibility patches for commercial applications. Buy new applications as needed. Custom-develop migration tools.

Budget: Zero to as much as $1,000 per PC for application upgrades.

Labor: Varies depending on upgrade path; at least two hours per machine manually, 100 or more hours of labor to develop and debug migration scripts or automated disk imaging software.

CONNECTIVITY

Tasks: Minor; replace Windows-based modems and incompatible network adapters.

Purchases: New modem and network interface card if required.

Budget: Zero to roughly $250.

Labor: Up to 30 minutes if new hardware must be installed.

DEVICES

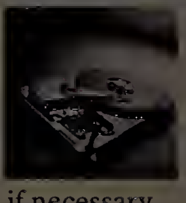
Tasks: New drivers may be required for older printers, video cards, storage components, input devices and so on. In some cases, device must be replaced with a Windows 2000-compatible version.

Purchases: Most drivers can be obtained from manufacturer's Web site for free; if new devices are required, costs could quickly rise.

Budget: Zero to $50-plus for new devices.

Labor: Automated installation: five hours to locate and obtain correct drivers for 10 applications. Manual installation: 40 minutes per machine after drivers obtained.

FILE STORAGE



Tasks: Upgrade to NTFS; add additional local storage capacity if necessary.

Purchases: 4G-byte hard drive costs about $150, if needed.

Budget: Zero to $150.

Labor: Install new hard drive: 30 minutes.

MEMORY

Tasks: Add 48M bytes of RAM to each PC (if memory slots are filled you'll need to purchase the full 64M bytes).

Purchases: 48M-byte module, $90; 64M bytes, $132.

Budget: $90 to $132.

Labor: 20 minutes per machine.

WINDOWS 2000 PRO

Tasks: Run system compatibility checker to ensure Windows 2000 compatibility; install new operating system.

Purchases: Windows 2000 Professional software.

Budget: Price for client license for Windows 2000 unknown at this point; probably around $99.

Labor: Manual installation takes one hour per machine without complications.

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PC Week Best of Show, *COMDEX/Fall 1998*

Database and Server Software 1998 Product of the Year *– InfoWorld*[5]

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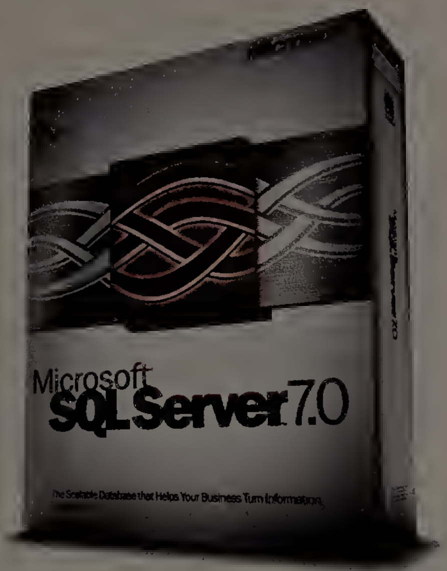
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USERS' Y2K FIXES WILL KEEP OFFICE 2000 IN THE WINGS

Companies plan Microsoft upgrade but are focusing on other business priorities

BY DAVID ORENSTEIN
NEW ORLEANS

YEAR 2000 work and other priorities will force many companies to wait until next year to roll out Microsoft Corp.'s Office 2000, users said last week at the vendor's Office 2000 Deployment Conference.

While users said they appreciate the upgraded suite's easier administration and Web integration features, few will have the resources needed to tackle a companywide deployment when the suite becomes available later this month.

Office product manager John Duncan said the 1 million users who signed up for beta copies is one indication many users plan to adopt Office this year.

Bayport, Minn.-based Andersen Corp., for example, will freeze new deployments by midyear because of year 2000. And the window maker won't be able to roll out Office to its 1,800 desktops by then, said technical architect John Weigel.

The U.S. Postal Service won't deliver the suite to desktops this year, either. "We've basically frozen all new deployments until after the year 2000," said Timothy S. Whiteside, a business systems engineer at the Postal Service in Raleigh, N.C. "We've got to make sure we put all our efforts toward Y2K and nothing else." The Postal Service is still rolling out Office 97 to some of its more than 100,000 desktops, Whiteside noted.

Whirlpool Corp. will likely wait until at least next year, said Kenneth E. Sayward, manager of workstation technical services at the Benton Harbor, Mich., appliance giant.

The company is finishing the worldwide rollout of 13,000 new desktops, which standardized users on Office 97, Sayward said. With year 2000 work looming, Windows 2000 in the wings and the next desktop rollout three years in the future, there's no rush, he said.

Not everyone is waiting, though. Partly inspired by features designed to ease installation and maintenance, New York business news provider Bloomberg LP expects to begin a rollout this year, said application support specialist Michael Schnitzer.

The software's custom installation Wizard will make department-specific installations easy enough to be manageable, he said.

Several users said they are looking forward to Office 2000's "self-healing" capability, which enables the program to reinstall missing files automatically. Whirlpool's Sayward said he hopes the feature will reduce calls to the help desk.

Users also said they had high expectations for Office's ability to enable intranet publishing and Web-based collaboration. With ActiveX objects, users of the Internet Explorer browser will be able to view and manipulate Excel tables. Meanwhile Access and Excel will be able to serve as front ends for SQL Server or Oracle relational databases.

"I have a lot of ideas," said Kathy Deeter, senior manager of client support at Houston-based energy market data provider IHS Energy Group. But IHS too is waiting out the millennium. "It's unfortunate we don't have the time to do it in 1999," Deeter said. ◗

Corel Signs Worldwide Bundling Deal

Ottawa-based Corel Corp. last week announced a partnership that will result in Corel's WordPerfect office productivity suite being bundled with millions of computers, but the greatest impact will probably be in homes and smaller business, an analyst said.

The bundling agreement with motherboard maker PC Chips Group of Companies in Hong Kong will put Corel's struggling suite on as many as 18 million computers worldwide. But, Dataquest analyst James C. Smith said, "It appears that these systems are sub-$1,000 'white box' systems, and I wouldn't expect to see increased penetration into the enterprise." – *David Orenstein*

SAP Tests Apps for Sales, Service Personnel

But back-end integration delays some pieces

BY CRAIG STEDMAN

SAP AG is starting to ship beta-test releases of new applications for traveling sales and service workers. But some promised features won't make it into the products until late this year.

Andy Zoldan, vice president of strategic initiatives at SAP America Inc. in Newtown Square, Pa., said SAP decided to strip out some functionality to free up developers to work on tying the new applications to its flagship R/3 back-office software — an integration job he called "enormous." But he declined to say what pieces are being left out for now.

John Bermudez, an analyst at AMR Research Inc. in Boston, said SAP executives told him it's taking longer than expected to develop technology for synchronizing data among mobile workers and R/3 corporate databases.

The full mobile sales and service packages won't appear until a follow-on release is ready for early users in the second half of the year, Zoldan said.

SAP has been slower to deliver sales, service and marketing applications than rivals such as Oracle Corp. — a fact Oracle underscored last week by formally announcing plans to hook its suite of front-office software to R/3 [CW, March 22].

Bermudez said the shipment plans that SAP laid out last fall for the sales and service packages were too aggressive then. "There wasn't much software written at all" then, he said.

In the past few months, SAP has rolled out a new supply-chain planning tool in similar piecemeal fashion to avoid missing the shipment dates it had set for that package, Bermudez added.

The first release of the sales and service applications went to pilot users last month and should start shipping by July. SAP is also developing marketing software that's due for beta-testing by year's end. ◗

3Com Drops Out of Storage Group to Focus on Networks

Move may 'slightly' delay products

BY NANCY DILLON

Just two weeks after joining a storage networking testing and development alliance with Storage Technology Corp., 3Com Corp. last week pulled the plug on its storage-area network (SAN) initiative.

In a prepared statement, 3Com President Bruce Claflin said the Santa Clara, Calif., company has decided to focus on markets closer to its core networking strengths.

"Now is the right time to take these actions," Claflin said, "before more money is invested and before [the] product reaches our customers."

The 3Com decision could mean slight delays in new products from 3Com's SAN partners, according to Aaron Schatz, an analyst at International Data Corp. in Framingham, Mass. Along with Louisville, Colo.-based StorageTek, partners include disk array maker Data General Corp. in Westboro, Mass., enterprise backup vendor Legato Systems Inc. in Palo Alto, Calif., and storage consolidation specialist MTI Technology Corp. in Anaheim, Calif.

"But the relationships that 3Com had were not exclusive or critical," Schatz said. For that reason, he said, 3Com's decision won't have a lasting effect on the overall SAN market. He said the partners will have to spend some time "regrouping" but noted they still have their own interoperability testing labs and will soon announce other important partner agreements.

"I don't think [3Com] is losing interest in the SAN market," said Mark Hargrove, a network architect for the United Space Alliance at the John F. Kennedy Space Center in Cape Canaveral, Fla. "I think they see the market as so large, they feel safe in taking a wait-and-see approach." Hargrove is building a SAN with six storage arrays, eight Fibre Channel switches and six Unix servers.

But David Hill, an analyst at Aberdeen Group Inc. in Boston, said 3Com's move does carry risk. The SAN market is in its infancy, Hill said, "and if 3Com misses its development, it may find it hard to re-enter the market, unless it pays a premium and buys one of the existing players." ◗

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MANUFACTURERS RENT ERP APPS

Partners offer services, applications in one place

BY JULIA KING

ATTENTION VIRTUAL company wanna-bes: Corio Corp., one of a fast-growing breed of software rental companies, has teamed up with $2 billion Flextronics International Ltd. to sell pay-as-you-go software services to companies that outsource their product manufacturing to Flextronics.

Their first customer, Vertical Networks, a data communications equipment developer in Santa Clara, Calif., is paying approximately $750 per user per month for access to customized PeopleSoft Inc. financial software and Baan Co. manufacturing applications. The applications are hosted and managed by Corio at Flextronics' plant in San Jose, Calif. Flextronics also manufactures Vertical Networks' products.

The one-stop applications and services arrangement enables Vertical to better focus on its core business of developing and selling voice/data systems, Vertical CEO Alan Fraser said.

Outsourcing lets Vertical "take advantage of expertise and technologies that we would not otherwise have access to," Fraser said. For example, buying and implementing its own enterprise resource planning (ERP) software would have cost Vertical about $4 million, Fraser said. But under the rental arrangement, Vertical was able to drastically reduce its initial capital costs for software. "We'll pay about 1/20th of what we would have spent to acquire a major ERP system," Fraser said.

For now, the Corio/Flextronics partnership is unique on the nascent application services front. But analysts anticipate seeing more such complementary service pairings as the software rental market continues to evolve.

"Application service providers are trying to build little 'keiretsu' by integrating different elements in the supply-chain infrastructure," said Bill Martorelli, an analyst at Hurwitz Group Inc. in Framingham, Mass. Keiretsu refers to interlocking relationships among manufacturers and suppliers in Japan.

Forrester Research Inc. in Cambridge, Mass., is projecting that the market for application rentals — which stood at zero just a few months ago — will reach $6.4 billion by 2001. ◗

JUST THE FACTS

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Microsoft Browser Users, Beware: Others Can Read Your Clipboard

BY CAROL SLIWA

Users of Microsoft Corp.'s Internet Explorer 5.0 browser might want to take care when they save data to their Windows clipboards for pasting into other applications.

Using JavaScript code or ActiveX controls, a malicious Web site operator can read the text in that Windows clipboard and save it to a Web server without the user's knowledge or consent.

Default Setting

What enables that is an Internet Explorer 5.0 feature called the Dynamic HTML editing component. By default, Internet Explorer 5.0 is set to allow developers to cut, copy and paste via script, as they can with Visual Basic, Office and other programming tools.

"The fact that they included the ability for Web designers to copy the end user's cache is not really what bothers me. What bothers me is that they set it to 'enable' by default. They could have set it to prompt the user," said Scott Waimer, owner and chief editor at Portland, Ore.-based System Optimization, a computer hardware Web site offering tips and reviews to PC enthusiasts.

A Microsoft spokeswoman said users can solve the problem by going to the browser's tools setting, choosing Internet options, clicking the security tab, going to the custom level and then onto the scripting heading and there setting "allow paste operations via script" to "disable" or "prompt."

Microsoft group product manager Rob Bennett said that setting the browser's security zone level to "high" also will work. ◗

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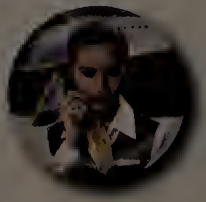

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MICROSOFT SAYS REORG TO PUT CUSTOMER FIRST

Skeptics wonder if support initiative is more ‘rhetoric’ than real

BY KIM S. NASH

MICROSOFT Corp.'s reorganization last week — the first major restructuring since the company formed an Internet group three years ago — is an effort to better satisfy customers, the company said.

However, it's unclear what effects, if any, information technology managers will see, said Mark Levitt, an analyst at International Data Corp. in Framingham, Mass.

Replacing the product-line divisions the company was founded on 24 years ago, Microsoft is now composed of units focused on different types of customers: corporate users, consumers and online businesses, mobile workers and developers (see chart).

“They can reorganize all they like, but the goal is still to get customers to buy all their products across all platforms,” Levitt said. “It's more rhetoric than anything else.”

Since becoming president in July, Steve Ballmer has vowed to “delight” customers — something Microsoft hasn't done consistently.

In an e-mail exchange with *Computerworld* Editor in Chief Paul Gillin last week, Ballmer acknowledged that some Microsoft customers have been unhappy with software quality, support and ease of use.

“We clearly could have done a better job in the past, and I'm determined that we will in the future,” he said.

In particular, customer support has been a disappointment to some large companies' IT managers [CW, March 22].

Microsoft is also expected this month to announce new customer support programs aimed at large IT shops. The company declined to cite specifics about the announcement but confirmed that a new contract option is under consideration that would let user companies bundle support for different Microsoft products under a single contract. Right now, users must buy separate support deals for each major product.

Big companies can be reluctant to shake themselves up too much for fear of messing with a formula that helped them grow, said Clay Christensen, a business professor at Harvard University.

Focusing on customers “makes all the sense in the world,” Christensen said. “But it doesn't really address the real threats to Microsoft [such as Sun Microsystems Inc.'s] Java and [open-source operating system] Linux,” he said. ▶

Microsoft's New Divisions

UNIT NAME	FOCUS	LEADER
Business and Enterprise	Corporate IT	Jim Allchin
Consumer Windows	Home PC users	Jim Allchin
Business Productivity	Mobile workers	Bob Muglia
Developer	Third-party developers	Paul Maritz
Consumer and Commerce	Online users and businesses	Brad Chase

Stratus Takes Fail-Safe Approach to NT

Device drivers, rigid pretests and recovery tools may boost NT systems' fault-tolerance

Five months after Marlboro, Mass.-based Stratus Computer Inc. was acquired by Ascend Communications Inc., Stratus' fault-tolerant computer business has been cut loose to operate as a privately financed, independent company with the same name.

The $275 million Stratus serves more than 700 customers worldwide focusing primarily on selling fault-tolerant systems to the financial services, retail, travel, health care and gaming markets. CEO **Steve Kiely** talked with *Computerworld* senior editor Jaikumar Vijayan about Stratus' new direction in delivering fail-safe systems in the Windows NT market.

Q&A

Q: Why should customers consider Windows NT products from Stratus?

A: We have a very strong and differentiated capability for supporting continuous operations that are both unique and difficult to replicate. We are in a blue-chip customer base that uses us for heartbeat applications. With our fault-tolerant NT product, we think we have the opportunity to establish a new category and to lead that category.

Q: How will the systems be different?

A: What we are going to do is have a full fault-tolerant hardware design where each part of the product is replicated, and the system is designed so that faults are detected and isolated automatically, and any [failed] parts are customer replaceable. The system will be able to connect automatically back to a Stratus service system which allows a Stratus technician to decide what action needs to be taken beyond that.

Q: How can you ensure fault-tolerance on the Windows NT operating system side?

A: We are going to be doing three things: We are going to provide device drivers and a [middleware] layer that isolates NT from any hardware abnormalities. Secondly, we are going to subject all our systems to months of continuous operations [before systems are sold] to make sure there are no memory leaks or other system problems. And third, we are going to be delivering a set of recovery tools for rapidly restarting [failed] applications.

STRATUS CEO STEVE KIELY wants to establish a “new category”

Q: What service capabilities does Stratus bring to the Windows NT market?

A: In our service model, we centralize the people and [spare parts] into four regional centers [around the world]. Because there already is a spare of every part in the machine, there is no real urgency in replacing the failed part.

The customer gets a red-light indication of a failed part, pulls it out and does a simple replacement when the spare arrives by Fedex the next morning. ▶

BRIEFS

Bad News for ERP

The drumbeat of bad news from enterprise resource planning (ERP) vendors continues. PeopleSoft Inc. in Pleasanton, Calif., last week said first-quarter profits will be below expectations because of weak sales of its ERP software. PeopleSoft issued its warning a week after an announcement by rival SAP AG that it will stop forecasting results because of uncertain demand for ERP applications.

SAP AG Buys A Little Red Hat

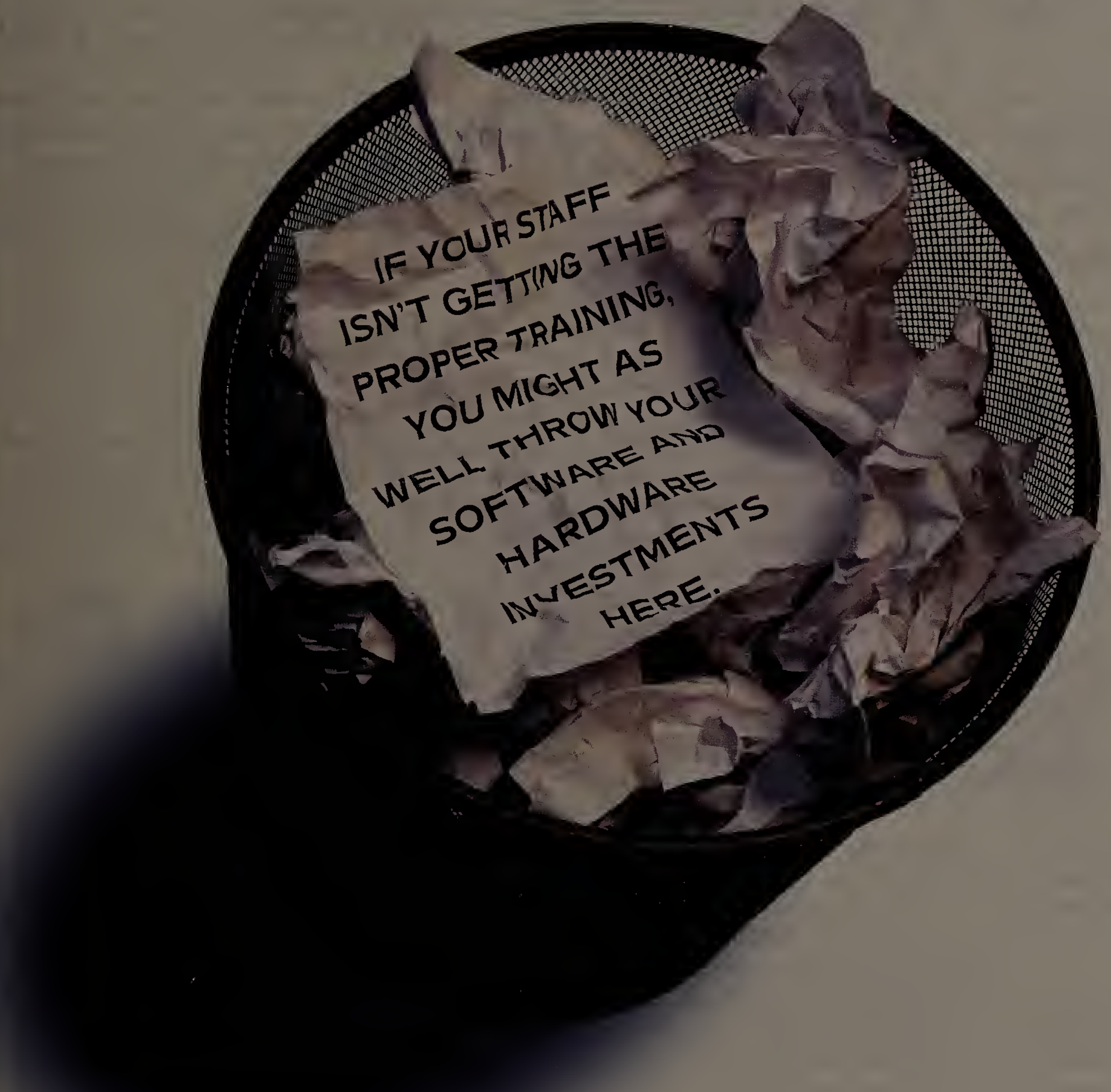
SAP AG last week said it's making a minority investment in Red Hat Software Inc., a Linux vendor in Research Triangle Park, N.C. SAP's venture capital unit in Palo Alto, Calif., said it will pay “several million dollars” for an ownership stake of less than 10%. Last month, SAP announced plans to port its R/3 applications to Red Hat's version of Linux.

Silicon Graphics Loss

Computer workstation maker Silicon Graphics Inc. in Mountain View, Calif., last week said it will report a larger third-quarter loss than Wall Street had forecast, citing production delays in its two key product areas. The company said its net loss in the third quarter, ended March 31, will be larger by 20 to 25 cents per share than the 7 cents per share analysts had expected it to lose.

Short Takes

Rockville, Md.-based AXENT TECHNOLOGIES INC., an information security company, last week announced the acquisition of U.K.-based PASSGO TECHNOLOGIES, a vendor of centralized user access and control products, for $50 million. . . . Last year, the WORLDWIDE SEMICONDUCTOR MARKET suffered its biggest decline since 1985, as 1998 semiconductor revenue was $134.8 billion, a drop of 8.4% from 1997, according to San Jose, Calif.-based DATAQUEST . . . . Houston-based BMC SOFTWARE INC. completed its merger with BOOLE & BABBAGE INC. last week.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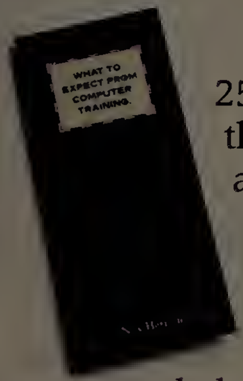
WHAT TO EXPECT FROM COMPUTER TRAINING

According to a Gartner Group study, employees without formal training use less than 25% of their applications. On the other hand, trained users can increase productivity more than 165%. And those numbers can make a big difference next time you need to get a budget approved.

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PAUL GILLIN

A new CA? Prove it!

YOU CAN'T BLAME customers of Platinum Technology for being a little jumpy these days. For one thing, most of them became Platinum customers by virtue of that company's 1995-96 acquisition spree. Then Platinum up and hit a financial wall last year. Now the company is about to be taken over by Computer Associates, a competitor Platinum has made sport of skewering for years.

PAUL GILLIN is editor in chief of *Computerworld.* You can contact him at paul_gillin@computerworld.com.

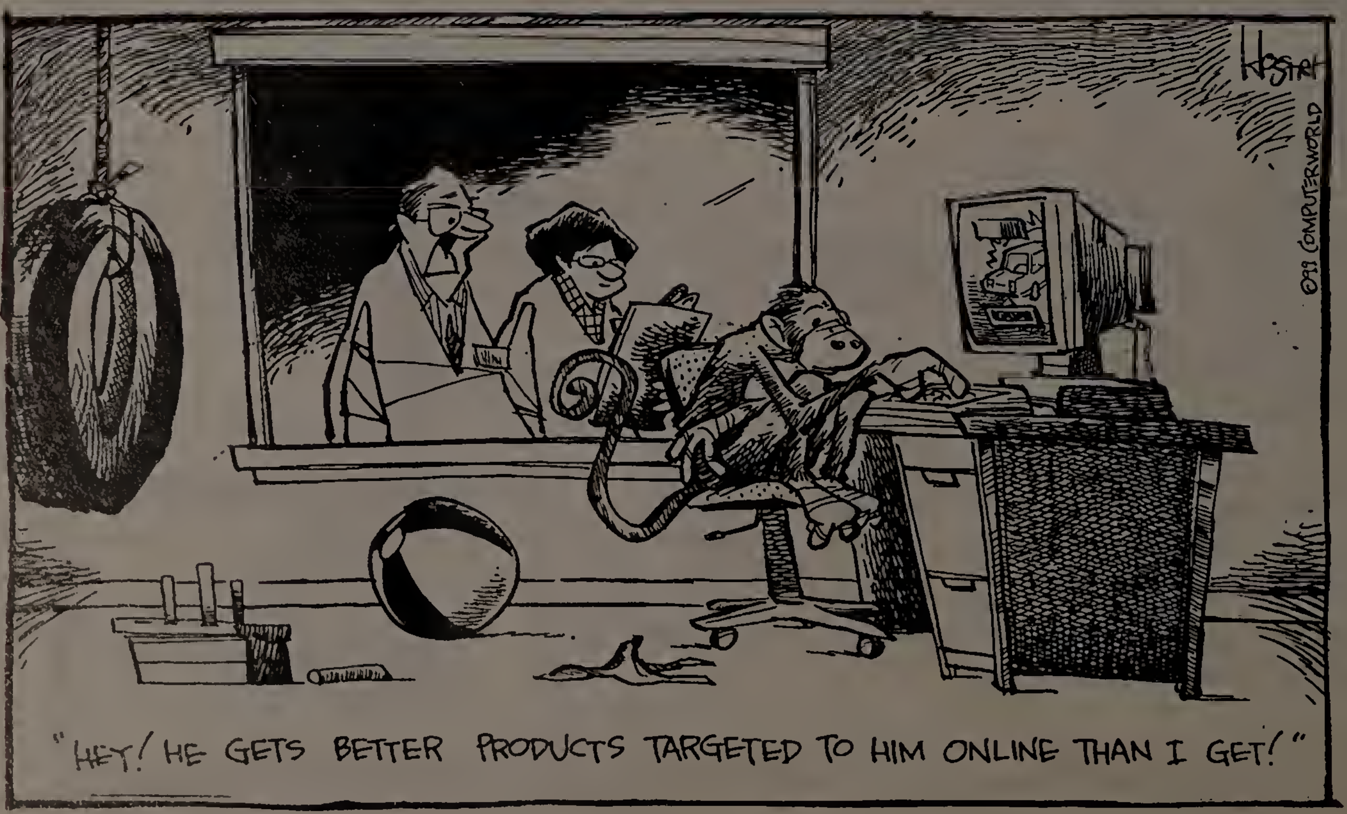
CA is the company a lot of users love to hate. Most CIOs I've talked to have some kind of horror story regarding heavy-handed CA sales or negotiation tactics, and our own research has for years shown an undertone of dissatisfaction with CA support. The company's acquisition playbook has typically featured deep layoffs, scaled-back support in some areas and aggressive price increases in others.

But today, CA says it's a new company. During the past three years, it has tried to shed the mean-spirited image, invite user input and develop a company vision. CA likes to point to its friendly, layoff-free 1997 acquisition of Cheyenne Software as an example of its more conciliatory approach.

If a "new" CA exists, then the Platinum deal presents an ideal opportunity to prove it. For this deal is cast in the classic CA mold: acquiring a troubled mainframe company with a big maintenance revenue stream and limited customer mobility. CA can reach out to these customers or cuff them on the ears.

CA should make an effort to contact every Platinum customer during the next few months and seek input on how to handle support, licensing and migration issues. It should craft a policy statement that reflects that feedback and publish it for all to see. And the company should commit to going ahead with Platinum's Platforum user group meeting in July and use it to present an open and conciliatory message to Platinum customers.

CA for a long time blamed the press and analysts for its image problems. But its biggest enemy was really the vocal complaints of customers of the companies it acquired. The Platinum deal presents an ideal opportunity to demonstrate that a new CA really exists and that it's willing to listen. ◗



"HEY! HE GETS BETTER PRODUCTS TARGETED TO HIM ONLINE THAN I GET!"

DAN GILLMOR

IT stands to lose in cable Net plans

YOU MAY HAVE HEARD rumblings of a battle over who can provide Internet access through the cable-television industry's wires. And if you're in IT, you've probably ignored it, figuring this isn't your fight.

Don't tune out this dispute. Even though the immediate controversy won't change your professional life in any significant way, the long-range prospects may be grim if the cable industry gets its way.

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Cable Net connections are wonderful for consumers: fast, always connected and, once tried, rarely abandoned. AT&T's TCI cable-TV subsidiary and other cable companies started the @Home Internet-access provider, which is the sole service provider for most cable-Internet connections. TCI has a controlling interest in @Home. (Another cable-Internet provider, Road Runner, provides exclusive access to some non-TCI cable systems.)

The issue is fairly simple. AT&T and other cable companies insist that they retain the right to bundle Internet access with their fast cable lines. This means that a customer who prefers, say, America Online or another provider will have to pay twice for Net access: once for @Home and again for the other provider.

This is unfair, but the cable companies are claiming otherwise. They say they'll pull the plug on upgrading their systems for fast, two-way data communications if they have to share their bandwidth.

Now, they do appear to have the law on their side. When Congress passed the telecommunications "reform" law in 1996, the lawmakers had their collective eye on helping the cable companies compete in the market for local phone service.

The motive was sound. But the result has been to let the cable industry control not just the data pipe but the first screen of content, too, when it comes to Internet connections. This is a new vertical monopoly in the making, and it stinks.

IT has a stake in the debate. For one thing, customers of the @Home/TCI service have to agree not to use point-to-point IP tunneling and other technologies that are useful in telecommuting. (That's because @Home will be glad to sell those customers a much more expensive Digital Subscriber Line (DSL) service.)

For another, the cable industry's logic is not just specious — it's also dangerous if applied to the phone companies, which are beginning to object to the double standard. Suppose the phone company could insist that it, and it alone, could provide Net access via its DSL connection. We'd quickly move toward a duopoly, a world with two dominant Internet providers in the high-bandwidth market. Telecommuters would pay more, which means companies would pay more.

The cable industry deserves a fair financial return for upgrading its pipes, and no one wants to give AOL and its ilk a free ride. But the industry's blackmail shouldn't be allowed to succeed.

This is IT's fight, too. ◗

DAVID MOSCHELLA

Why it's time for a new way to handle time on the Net

I'VE NEVER BEEN A BIG FAN of the phrase, "operating on Internet time." Although it's certainly true that Net-based businesses have to move quickly, so do many other businesses. The expression typically carries with it a distasteful hint of smugness, an implicit put-down of those not fully part of the cybereconomy. It's not as bad as "they just don't get it," but it often stems from the same sort of divisive bad manners.

So it's a relief to see that Internet time is now taking on a much more practical and inclusive meaning. I'm referring to recent efforts to promote a new planetwide way to tell time, a useful alternative to time zones, daylight savings, international date lines and other complexities. In Internet time, it's the same time everywhere.

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The system, promoted mostly by Swatch, breaks each day into 1,000 "beats" each 1 minute and 26.4 seconds long. For example, @500 is 6 a.m. in New York, 8 p.m. in Tokyo, and noon at Swatch's headquarters in Switzerland. (For more details, check out *www.swatch.com.*)

Although the attempt to establish a single global time might seem either hopelessly quixotic or a cynical plot to sell new watches, the concept should prove to be remarkably useful in a wide array of business and consumer activity. It's one of these ideas whose potential applications become abundant once one's imagination starts to run. Plus, it's free, simple and even fun to do. You'll soon be seeing it on Web sites everywhere.

Essentially, Internet time can be useful whenever you're operating across time zones. If you're promoting a Webcast, it's much easier to say the show will begin @700 Internet time, rather than 10 a.m. Eastern Standard Time, which might mean nothing to someone in Singapore.

Similarly, if you want to efficiently run a global chat service, it would be great to have an intuitive way of letting everyone know who is going to be online when. Teleconferences are another obvious application, whether participants use the Web or not.

There will be important business applications as well. Have you ever tried to rebuild an accurate chronological sequence of global e-mails or transactions from multiple organizations? Internet time can make this a simple matter of sorting. Additionally, a common system of measurement can make it much easier to assess, understand and describe global site usage patterns.

Transportation, shipping, global positioning and other mobile systems are other natural applications. For example, service performance could be calculated by simply subtracting one Internet time from another.

Of course, we could do all of this with our existing 24-hour clocks, universally using, for example, Greenwich Mean Time. But someone would have to make the promotional effort needed to generate a critical mass of users, and that's unlikely to come from the British Royal Observatory. Besides, apart from daylight savings effects, GMT is basically the same as English time, and the world is unlikely to standardize on any one country's time zone.

Clearly, the 24-hour clock isn't going away; it's still good to know whether people around the world are likely to be working or sleeping. But because both systems have real value, you might want to do exactly what Swatch wants you to do: Buy yourself a dual-system watch, and start getting comfortable with Internet time.

The Net is busy creating one world; it would be nice if we could all agree on what time it is. After all, it's only good manners. ◗

READERS' LETTERS

Pale consistency in articles' comparison

HAVING READ both the Windows 2000 article ["Windows 2000 Directory Gains Ground on NetWare, Unix," CW, Dec. 14] and the article titled "Unix Holds Steady" [CW, Dec. 14], I believe some commentary is in order. The first article presents some seemingly impressive reasons to justify the assertion that Windows NT 5.0 (2000) will eventually surpass NetWare and Unix. But it presents no hard data to support the claims.

The second article essentially sinks the case and in the process, exposes a flaw in the NT vs. Unix and/or NetWare argument. It harshly illuminates NT's fundamental shortcomings as an operating system as it cites Unix as the unchallenged leader in the three most important attributes an operating system can possess: performance, reliability and scalability. The only areas in which NT seems to have a lead are those that are secondary in nature, such as ease of management, cost of ownership and directory services.

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NT like an old friend

YOU CAN'T pick up a publication without seeing the word "Linux." It's clearly the latest buzzword in the IT field. Everyone is pushing and shoving to jump on the bandwagon.

I have been in the IT field for 25 years and have seen many amazing technology advancements. I began using Unix approximately four years ago, and I must say, it's the most user-unfriendly interface I have ever seen. It's no wonder that Microsoft's Windows NT is so popular — you don't need a novel to use it.

Don't get me wrong, NT has its problems, and Microsoft does act like it owns the world. If I want to tell Unix to do something, I have to type gibberish that reminds you of the way cursing is depicted in cartoons. This is unacceptable. Now they tell me my desktop has to learn to "curse," too.

Put me down as being one person against the idea of going backward in time. You don't have to like Microsoft to see that it is trying to make our lives easier. I guess some people will accept any solution as long as it's not Microsoft.

I guess I'm just old-fashioned.

Kevin L. Adams
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Light on OS/2?

I'M DISAPPOINTED that *Computerworld* is not covering events in the OS/2 world. IBM is still supporting the OS, as are third-party vendors and, of course, Lotus. IBM is also going to release Aurora, the newest release of Warp Server for e-business. Along with this, IBM is releasing the Aurora client, the newest desktop release of OS/2 Warp.

There are things happening in the OS/2 world that are not being reported in *Computerworld* but are being reported in IBM's newsletter. How come? Is the IS news media biased toward desktop and server OS now? If CW has time to inform the public about the other desktop operating systems, then it can at least report on the alternatives. One reason I chose *Computerworld* is that I expected reporting not just on the market leaders but their alternatives, too.

There is still time left to my subscription, so I will be waiting and watching.

Frank Mosesso
Programming staff specialist
The Harleysville Insurance Cos.
Harleysville Insurance Group
Harleysville, Pa.

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701 Fax: (508) 875-8931; Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

DAVID KELLY

Looking at ROI alone leads to a dead end

COMPANIES considering new technologies such as electronic commerce should avoid depending solely on metrics like return on investment to gauge their success in new areas.

Sure, traditional ROI analysis is great for bottom-line questions such as "How much will my organization save by implementing a new technology?" and "How quickly will I earn back my investment?" But becoming an electronic business requires vision and risk. Companies merely trying to reduce costs and manage the bottom line will soon find themselves at a dead end.

DAVID KELLY is vice president of application strategies at Hurwitz Group Inc. in Framingham, Mass. Contact him at **dkelly@hurwitz.com**.

Instead, look at a different metric: return on opportunity (ROO). Designed to extend a conventional ROI, an ROO analysis helps organizations define and quantify potential *top-line* benefits of deploying new strategic business applications and technologies, including revenue, market capitalization, increased customer base and decreased attrition.

The challenge with measuring those opportunity benefits is quantifying them in dollars so that they can be used in the ROO calculation. To do that, you can classify the high-level benefits into four major categories:

- **Attracting New Customers** (also known as competitive advantage): Estimate the potential increase in new customer transactions and multiply that by the value of the average transaction. You can assume that number to be valid for the life of the competitive advantage that's generated by bringing a product or service to market more quickly.
- **Keeping Existing Customers** (also known as customer service): Estimate the potential reduction in customer turnover and then multiply that number by the cost of acquiring a new customer.
- **Increasing Existing Customer Business:** Estimate the potential increases in customer transactions and multiply that number by the dollar value of the average customer transaction.
- **Increasing the Company's Value:** Estimate the potential increase in market capitalization as a result of increased business, visibility or good will resulting from strategically deployed technologies. You can also quantify it by estimating the decrease in time-to-market and resulting increase in business.

Clearly, you don't need to do an ROO analysis for each purchase decision. If you need new debugging tools or project management software, you can make an ROI-based decision.

ROO analyses are most effective when the technology is expensive, crosses departmental boundaries, integrates disparate capabilities or provides capabilities that an organization hasn't had or addressed before, such as electronic commerce.

For example, though enterprise application integration (EAI) is a hot buzzword, most organizations are evaluating EAI tools for straightforward integration projects between two packaged applications. Instead, they should conduct an ROO analysis to understand how they can use the messaging, business process modeling and dynamic nature of EAI systems to increase revenue and growth opportunities. An ROO for EAI could help organizations understand what business benefits of implementing an EAI product.

ROO fosters better and more practical benefit definition and more realistic goal-setting in addition to identifying and quantifying the opportunities for growth that new technologies can deliver.

Tomorrow's successful companies will be the ones that can identify and apply an ROO analysis to new technologies and products before their competitors do. ▶

ROD DIXON

The Feds should act to ensure our privacy online

WHEN IT COMES to matters of privacy and technology, neither buzzwords nor passwords nor even security software will adequately protect your personal information from snoops.

ROD DIXON is an attorney at the U.S. Department of Education in Washington. Contact him at **rod@cyberspaces.org**.

Software industry advocates have joined several public-interest organizations in framing the debate over computer privacy as a matter involving a conflict between competing convictions on the use of encryption technology. But the benefits of encryption are actually quite limited.

To prevent your information from falling into the hands of data pirates, you will need to take precautionary measures such as using encryption technology when sending data across public networks. But more important, you may need to join the growing number of computer users who are insisting that the federal government enact a uniform privacy law that gives you the right to go after snoops who violate your privacy rights.

Recently, Intel created a virtual brouhaha over privacy issues when it revealed that its new processor, the Pentium III, contains a digital identification number that could become as useful as a Social Security number in identifying computer users. While many information technology professionals have rightly pointed out that the Pentium III's serial number is nothing new when it comes to the use of technologies like networked computers, cellular phones or even fax machines, privacy advocates are using Intel's misstep to refocus the privacy debate on the plausible uses of encryption technology.

A revelation a few weeks later that Microsoft put identification features into each document created in its Microsoft Office programs and had collected information about users even when the users clicked off this feature in Microsoft's registration software added fuel to the fire.

In some instances, reliance on encryption technology is appropriate. For example, while sifting through the search results on health maintenance organizations from an Internet search engine recently, a computer user came across a strange message. When she clicked on the link, she received an incredibly large quantity of private medical records on her Web browser. The records included more than 18M bytes of patient records from the University of Michigan's health system. It's uncertain how the files were posted to the Web; one theory is that an employee added the links to the search engine. No matter how the files landed on the Internet, encryption clearly would have added significant privacy protection for those patients' medical records.

But encryption can't always be used. Consider the case of GeoCities. A Web site that hosts thousands of user "communities," GeoCities started collecting vast amounts of personal information from its users — including the youngest ones. When GeoCities started selling the information, the Federal Trade Commission (FTC) started getting complaints from angry parents. The FTC finally responded by forcing GeoCities to let its users opt out of GeoCities' data mining practices and maintain their privacy.

More recently, the Web auction site eBay faced allegations that it permits anyone — whether they are selling legitimate products or pushing a scam — to become a registered user and gain access to personal information about other eBay users. EBay doesn't have a way to protect the privacy of its users, allowing them to be duped by con artists. In all likelihood, the government will soon step in to regulate eBay as it did GeoCities.

That's good, because a technology-driven solution isn't the answer to our online-privacy problems. No one should be stunned to learn that technical encryption standards were neither practically intended nor theoretically presumed to safeguard the most important aspects of our personal privacy.

The reality is that technology-driven solutions to computer-based privacy invasions will never stand in the place of strong laws as an assurance for sufficient protection of our privacy. The federal government should enact a powerful law protecting personal privacy. ▶

ARE YOU GETTING WHAT YOU NEED FROM YOUR NETWORK OPERATING SYSTEM?

Add Joseph Kvedar of Partners Healthcare System to the growing cadre of Windows NT Server advocates.

KURT STIER

Productivity soars when an OS goes beyond the basics and includes the full range of networking services

ARE YOU GETTING WHAT YOU NEED FROM YOUR NETWORK OPERATING SYSTEM?

Productivity soars when an OS goes beyond the basics and includes the full range of networking services

Snapper Inc., a midsize manufacturer that produces 120 different lawn products from its plant in McDonough, Ga., knows IT operating systems. It has experience with the IBM AS/400s, Novell NetWare, and Microsoft® Windows NT® Server. But when it came time to determine a platform for a critical sales force automation application that needed to integrate with a wide range of back-end systems, the company chose Windows NT Server without hesitation. "Applications are cheaper and faster to develop and easier to run in the Windows NT world," explains Howard Jones, Snapper Inc.

ANN STATES

"Applications are cheaper and faster to develop and easier to run in the Windows NT world," says Howard Jones, Snapper Inc. vice president and CIO.

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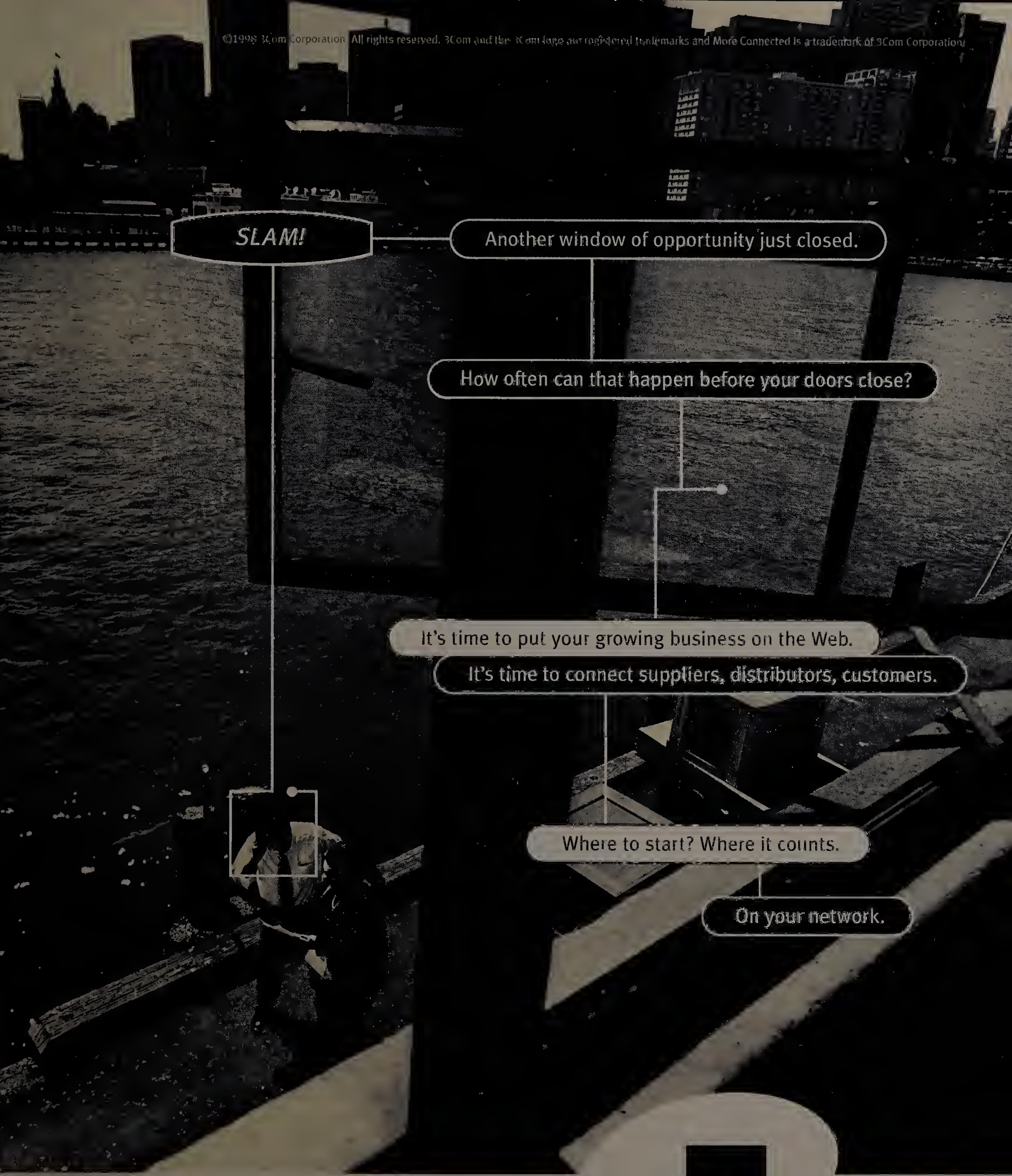
SLAM!
Another window of opportunity just closed.
How often can that happen before your doors close?
It's time to put your growing business on the Web.
It's time to connect suppliers, distributors, customers.
Where to start? Where it counts.
On your network.

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Nobody ever said running a business was going to be easy. Of course, there are ways to make yours more capable. More competitive. More connected. Take 3Com networking solutions for growing companies. They'll help you make the most of everything from e-mail to e-commerce. Visit www.3com.com/moreconnectedbusiness for the facts. And discover why 3Com has connected more people, to more networks, in more ways than any other company.

vice president and CIO.

A year ago Adaptec Inc. found itself wrestling with too many network servers. At its Milpitas, Calif., headquarters alone, it had over 75 NetWare servers providing file and print services as well as basic application and database services. Each NetWare-based application required its own server due to reliability issues, and the number of support administrators kept growing. By switching to Windows NT Server 4.0, Adaptec can run multiple applications and databases on the same server platform and consolidate its file and print services without compromising reliable file and print, reports Ryan Fernandes, Adaptec network operation manager.

> **"There is no question that reducing the number of operating systems can lower costs."** **-Jamie Lewis, president, Burton Group**

As Adaptec and Snapper have discovered, in today's complex and high-pressure IT environments, anything easier, faster, and less expensive will be welcomed. Where one technology can do the job of two or three, and do it as well or better, it is sure to be embraced by IT groups, especially midsize ones that may lack specialized resources.

THE BIG SQUEEZE

Organizations today find themselves increasingly squeezed. Business users are demanding more IT services and capabilities. They want reliable and fast file and print sharing, as usual, but they also want email and messaging. They want rich standards-based intranet solutions and database applications that are as easily accessible by remote users as by employees connected to the LAN. They want to use rich, new types of information, such as IP-based telephony and audio and video. And, they want to leverage existing systems to provide strategic advantages. At the same time, they want to ensure a smooth migration to a more open, flexible infrastructure—one where servers can be re-purposed as needed. And IT, business managers insist, must provide it all in a way that ensures security and reliability.

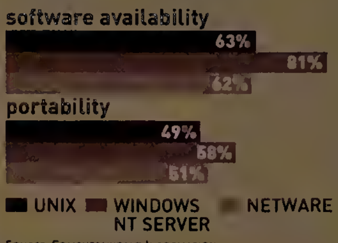
At the same time, global competition is forcing organizations to cut costs. The IT group is under the gun to do more with less, and reduce the cost of ownership. Midsize organizations, for example, no longer can maintain multiple IT platforms and train different sets of administrators. As a result, every aspect of the IT function is open to question: training, the number of administrators, the mix of vendors and platforms, and more.

DOING MORE

Key to controlling costs while delivering the enhanced IT services is the multi-purpose operating system, such as Microsoft Windows NT Server. Multi-purpose operating systems incorporate a range of functionality: file and print serving, application services, Web services, communications, and more, observes Jean Bozman, software analyst, International Data Corp. (IDC), Framingham, Mass. But the value goes beyond functionality; multi-purpose operating systems like Windows NT Server also integrate the functionality with a set of management tools and services and a common directory that ensures that the result is far greater than the sum of the parts.

WINDOWS NT COMES UP STRONG

Below are percentages of IT managers who said their OS platform rated good or very good in these criteria.



Source Computerworld Information Management Group Telephone Survey

In response, IT managers at midsize companies are looking to consolidate and standardize. "You want to have uniform, consistent capabilities, which is how you can control cost of ownership," advises Brian Connelly, CEO, Enterprise Communication Messaging Solutions (ECMS), Inc., Columbia, S.C., the systems consultant that developed the Snapper sales force automation solution. With uniform, consistent behavior across all systems, applications can be built faster and cheaper, fewer administrators are required, and training is reduced. You also achieve easier, more complete interoperability.

By switching to Windows NT Server, for example, Adaptec not only was able to reduce the number of administrators by about 30%, but each administrator "could do much more than administer a server," Fernandes explains. Because the operations are GUI-based, administration is easy and consistent across services, which allows Adaptec's server administrators to also handle the databases and the applications.

→ *Continued on page 8*

YEAR OF THE RAS-VPN

Windows NT Server delivers open communication

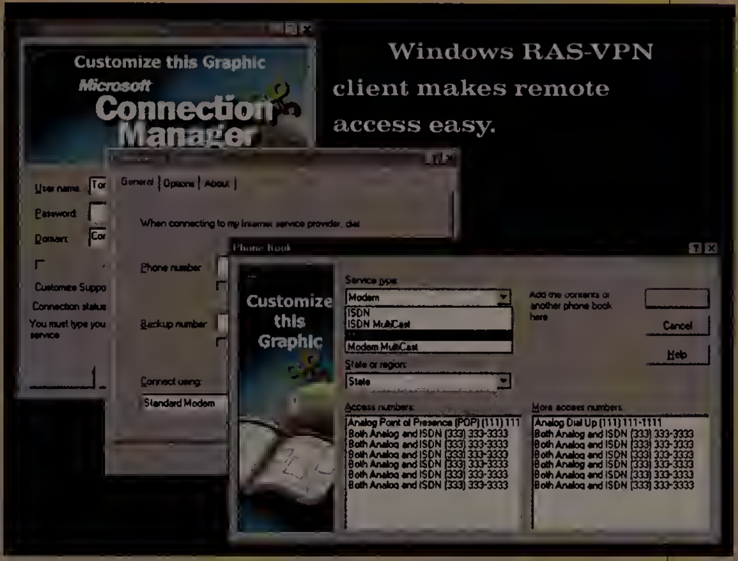
To work effectively, people need to communicate and access information easily and efficiently. With the advent of the Internet and e-commerce, organizations need open, flexible, interoperable solutions — not the proprietary point solutions of the past.

Today, open systems — server-based systems that allow organizations to pick and choose among a wide choice of diverse yet interoperable hardware and software products — are enabling companies to change the way they build and manage voice and data networks. Citing a second generation of products and falling prices, IDC projects the RAS (remote access services) market to exceed $700 million, reflecting a 51 percent CAGR since 1998.

Windows NT Server is the open systems platform for a new generation of simpler, more affordable communications. Organizations today dramatically reduce costs, and increase productivity, by connecting telecommuters, mobile employees, satellite offices, and extranet partners with Windows NT. Windows NT Routing and Remote Access Service and VPN (virtual private network) capabilities facilitate remote access management. Using the Internet and direct private-line connections, Windows customers can easily deploy integrated networking solutions that optimize their application and security needs in the most efficient way possible. According to Infonetics Research, San Jose, Calif., the number one remote access strategy for companies is to deploy a combination VPN/direct-dial service.

Windows NT Server is also helping to dramatically reduce remote access deployment costs with the Connection Manager Administration Kit (available in the Windows NT Option Pack). Using this tool, organizations can centrally configure and deploy single sign-on remote access clients for direct-dial and VPN. Windows NT Server's centrally managed phonebooks ensure these clients can easily access up-to-date local RAS or VPN dial-up phone numbers to make least-cost connections. "By building in and integrating secure VPN, routing, and direct-dial services, we make connecting users and offices easy and safe to use," explains Microsoft's Mike Nash.

Windows NT Server, IDC reports, currently can support hundreds of simultaneous RAS users and Windows load balancing services, and embedded solutions promise even more scalable VPN services. Windows 2000, IDC adds, will handle significantly more simultaneous RAS users.



Windows RAS-VPN client makes remote access easy.

Connect using: Standard Modem

Service type: Modem

ISDN
ISDN MultiCast
Modem MultiCast

State or region: State

Access numbers:
Analog Point of Presence (POP) (111) 111
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333

More access numbers:
Analog Dial Up (111) 111-1111
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333
Both Analog and ISDN (333) 333-3333

HIGH-TECH HOTEL Organizations of all sizes are capitalizing on the integrated communications services of Windows NT Server and innovative network-aware applications. For example, using a Windows NT-based solution, the San Jose Hyatt hotel was able to extend to its high-tech clientele fast, easy, and secure high-speed access to the Internet so they can be more productive while on the road.

The hotel's primary business customer is laptop equipped and travels frequently to Silicon Valley. Through Windows NT Server and San Diego-based ATCOM/INFO's IPORT secure, reliable, public Internet access solution, the hotel is able to provide information and high-speed Internet connectivity in more than 250 of its rooms. The service makes available high-speed Internet links for guests to use to connect to their company networks with Windows VPN services. "Since we turned it on last April, we've experienced steadily increasing usage," reports Jeffrey Burg, executive assistant manager. Now the hotel is looking at more integrated application services it can provide to better service its high-tech clientele with Windows NT Server.

COMPAQ AND MICROSOFT: BETTER PARTNERSHIPS= BETTER SOLUTIONS= BETTER ANSWERS FOR CUSTOMERS

CIOs and IT managers today are faced with some pretty tough questions:

- "How do I demonstrate IT business value?"
- "How do I ensure secure network access from anywhere, anytime?"
- "How do I create a flexible, scaleable IT infrastructure?"
- "How do I manage my heterogeneous network?"

Many organizations have already selected Windows NT Server to meet their computing needs.. With any server deployment comes risk – risks of mis-planning for a growing business' needs, risks of inefficient deployments, and risks of complex and costly operations. How does IT management minimize these risks? Wise choices.

WHAT'S HARDWARE GOT TO DO WITH IT?

Does hardware make a difference in deploying Windows NT servers? You bet it does. Deploying a scaleable and highly available Server requires a reliable, standards-based hardware platform that helps customers to achieve and sustain competitive advantage, achieve quicker return on their server investment as well as reduce complexity and costs in their IT environment.

Not every hardware vendor is equipped to deliver the kind of performance. Compaq's long-standing partnership and history with Microsoft ensures that both, the server software and hardware are stress-tested, co-engineered and fully optimized for highest performance and reliability. Compaq ProLiant represents the most stable computing environment for running Windows NT based Networking and Application Servers.

There are four main factors that make Compaq ProLiant the platform of choice for Windows NT Server deployments: Fruits of the Frontline Partnership, Shared Commitment to Reducing Complexity, Engineering Excellence and Value-Added Services.

THE PROOF IS IN THE PARTNERSHIP

Compaq's close alliance with Microsoft strengthens its ability to support Windows NT Server deployments with minimum risk and maximum cost effectiveness. Compaq has more hands-on, real-world experience with Windows NT Server than anyone else in the industry. In the past 4 years, Compaq has helped over 3 million users migrate from a multitude of environments to Windows NT. In fact, Microsoft recently named Compaq the first worldwide Prime Integrator for Windows NT.

Compaq has fostered a close relationship with Microsoft for over 15 years – dating back to 1983, formalized as the Frontline Partnership in 1993. This partnership has provided customers a superior Windows NT server platform that is simple to install, easy to use, and provides excellent value and performance.

The simple reason that the Compaq/Microsoft combination has won over so many customers is that it simply works better and more reliable than competitive solutions. From simplifying installation, to being able to accurately configure the solution, to operating with peak performance, Compaq ProLiant/Windows NT-based solutions make IT management's task easier, the customer's business more productive – and ultimately, through increased uptime and decreased costs of ownership – more profitable.

COMMITMENT TO SIMPLIFICATION

Compaq and Microsoft alike recognize that deploying enterprise-class networks and applications is often a complex, time and resource-straining task for customers. With a co-commitment to simplifying the planning, deployment, and operation of Windows NT-based networks and solutions, Compaq provides expertise and smart tools that enable customers to reduce complexity, save time and resources over the life of the server and continues to deliver customer-driven innovations that address key challenges in the IT environment.

Compaq ActiveAnswers for example is the industry's leading online destination for enterprise computing solutions and services. ActiveAnswers serves as a information hub for resellers, VARs, solutions integrators, consultants, ISPs, Web developers and self-integrating companies to gain access to over 40 jointly developed and fully tested solution areas.

> **"Compaq and Microsoft work together at a fundamental level to provide the highest possible levels of integration, reliability and performance. The Frontline Partnership works for our customers."**
>
> ***–Eckhard Pfeiffer, President and CEO, Compaq Corporation***

DID YOU KNOW?

- **Compaq commands the clear lead in the NT server market with more than twice the volume of the nearest competitor...**
- **Compaq and Microsoft were the first vendors to break the $20/tpmC barrier with the most recent ProLiant 7000 / Windows NT 4.0 TPC-C benchmark.1**
- **In the past four years, Compaq helped over 3-million users to migrate from other NOS environments to Windows NT...**
- **Compaq has nearly 4 million seats of Microsoft Exchange under deployment contract**

Microsoft is one of Compaq's premier ISV partners participating in the co-development of ActiveAnswers. Today, users can gain access to ActiveAnswers for Microsoft Windows NT Server 4.0, where they will find proven methods and best practices for developing and deploying Windows NT 4.0 based networking platforms, as well as ActiveAnswers for various Microsoft Solutions like MicrosoftExchange, Microsoft Site Server, and Microsoft Internet Information Server.

ENGINEERING EXCELLENCE

Compaq and Microsoft engage in many co-engineering and testing efforts including benchmarking, architecture development, and developing lifecycle enhancers.

The Compaq ProLiant family of servers has made headlines for its technological innovations with Fibre Channel, HotPlug PCI, its SmartStart installation tools and available sizing and configuration tools for Windows NT Server based solutions. Combining Compaq ProLiant with Windows NT delivers customers the most optimized platform for networking infrastructure as well as application server deployments.

ENHANCING SOLUTIONS WITH SERVICES

One of the crown jewels of Compaq today is its Services Organization. Its portfolio of customer-proven services features Windows NT-related offerings including: Enterprise Windows NT Services, Microsoft Exchange Services, Internet/Intranet Services, Financial Services Industry Solutions, Intelligent Network Service Solutions, Lifecycle Services, Support Services for Windows NT and High Availability Services.

Compaq Services boasts more Microsoft Certified Solution Developers (MCSDs) and Microsoft Certified Solution Engineers (MCSEs) than any other vendor combined. MCSE and MCSD represent the highest certification level for Microsoft technologies, and Compaq currently has over 2,200 professionals certified at this level and will add 1,000 more by the end of 1999.

WHAT'S NEXT FOR THE COMPAQ WINDOWS NT SERVER PLATFORM?

1999 presents a unique balancing-act challenge for CIOs and IT managers – as they address questions about network management, scalability, reliability, and reducing TCO, they also face the additional question of "Will our organization be Y2K resilient?" After the Y2K milestone comes and goes, attention will refocus on creating the web-enabled enterprise. As the demand for multi-dimensional and inter-connected supply chains increases, enterprise customers will turn more and more to the Internet extending their networks into "business ecosystems." The flexibility and robust nature of Windows NT provides the digital nervous system for bringing these ecosystems to life. Together as business partners, Compaq and Microsoft will continue to work to make these ecosystems interoperable, secure, manageable – and affordable. That's what the Compaq and Microsoft partnership is all about – delivering best of class enterprise solutions to customers worldwide.

COMPAQ

THE COMPAQ AND WINDOWS NT SERVER 4.0 ADVANTAGE:
http://www.compaq.com/partners/microsoft/products/nt4desc.html

COMPAQ ACTIVEANSWERS FOR NT SERVER 4.0:
http://www.compaq.com/activeanswers/about/info_winnt.html

COMPAQ/MICROSOFT FRONTLINE PARTNERSHIP:
http://www.compaq.com/partners/microsoft/about/index.html

COMPAQ PROLIANT SERVER INFORMATION:
http://www.compaq.com/products/servers/

← *Continued from page 4*

"We are getting more bang from our administrators," he reports.

In the past, IT has turned to specialized operating systems to perform different functions. This came about because of the limitations of the technology at the time, particularly PCs. "A PC with a 386 processor simply couldn't run big databases or applications, which is a key requirement for serious business servers," explains Mike Nash, director, Windows® Server and Infrastructure Product Marketing Group at Microsoft. Organizations that needed sophisticated application or database serving were forced to buy RISC-based hardware running Unix and operate it alongside their PCs.

> **"Windows NT is already a requirement for success among virtually all industry vendors."** - **International Data Corp.**

Suddenly organizations were running three or more operating systems and deploying dedicated proprietary point solutions. This created headaches for the IT group, requiring them to hire and train administrators for each OS, and to try to forge some level of interoperability between platforms.

"In the 1980s it was all we could do to knit PCs together. In the 1990s, we want better interoperability. We also want more capabilities, including integrated Internet," IDC's Bozeman notes, explaining the evolution from network operating systems that simply allowed organizations to tie together PCs to today's multi-purpose operating systems that integrate a wide range of functionality. Moving forward, organizations will not only want that range of functionality but seamless interoperability and efficient, effective administration and management.

WINDOWS NT SERVER DELIVERS BENEFITS

As its term implies, the multi-purpose operating system includes a range of capabilities. Ideally, the multi-purpose OS will allow the organization to easily enable or disable particular functionality as dictated by the organization's situation, explains Jamie Lewis, president, Burton Group, Salt Lake City. This reduces the investment risk while providing the power and scalability of dedicated servers.

Windows NT Server offers the kind of multi-purpose capabilities once associated with more costly and often proprietary platforms. Highly modular, Windows NT Server enables midsize organizations to pick and choose functionality and add new functionality as needed. Specifically, Windows NT Server:

- Provides fast and reliable file and print.
- Handles sophisticated applications and complex relational databases.
- Offers Web application services, as well as advanced communications with integrated remote access services.
- Integrates advanced features such as virtual private networking and streaming media.
- Provides efficient management and administration, with enhanced hierarchical directory support coming shortly.
- Offers a robust, tightly integrated security model that delivers complete security through a single, efficient security process.
- And all of these features come wrapped with an integrated set of services that enable organizations to efficiently administer their open, distributed systems environment.

Ultimately, the payoff from the multi-purpose operating system is more effective computing. "There is no question that reducing the number of operating systems can lower costs," says Lewis.

The lower costs are achieved through savings that result from the simplified, consolidated computing environment due to advanced, tightly integrated functionality and consistent security. This allows IT groups to redirect administrators toward higher value work. Adaptec, for example, cut more than 30 servers as well as redeployed its administrative staff. Particularly for smaller and midsize companies, Lewis concludes, "the multi-purpose operating system will become more important."

Over the past several years,

WINDOWS NT GAINS ON UNIX, NETWARE

Percent of business applications supported by each operating system today and two years from now (base of 201 respondents)

applications	today	2 years	% of change
UNIX (161 [illegible]	30.0%	31.0%	+3.6%
[illegible] ERVER ([illegible]	31.6%	44.1%	+39.3%
NETWARE (14[illegible] responses)	27.7%	17.6%	-36.6%
[illegible]	10.9%	7.4%	-32.4%

Source: Computerworld Information Management Group Telephone Survey

WIRED MEDICINE

Windows NT streaming media helps with healthcare training

Streaming media—rich, synchronized audio, video, and Web pages—plays an increasingly important role in organizations. Many companies are turning to streaming media over the network to reduce training costs by eliminating the need for workers to travel to training sessions. At the same time, it can provide a better training experience to more people.

Windows Media Services in Windows NT Server, for example, allows Partners Healthcare System, Boston, to literally put its medical expertise on the Web. The health organization, closely affiliated with the world-renowned Massachusetts General Hospital, is committed to educating physicians and healthcare professionals. Having already standardized on Windows NT Server, the organization had no trouble adding audio/video to its educational offerings, reports Joseph Kvedar, director of telemedicine.

"In the past, we brought people into an auditorium. Now they can access the same thing through a Web site using their browser and the Windows Media Player," Kvedar explains. Though it's not quite the same, he adds; it's better. Through the Web site viewers can simultaneously access supplemental information, such as PowerPoint® slides. The result is a richer experience for users. At the same time, Partners is able to reach a broader audience while saving time and money.

▸▸▸ Windows Media Services allowed Partners Healthcare System to easily add audio/video to its educational offerings, says Joseph Kvedar, director of telemedicine

KURT STIER

Microsoft has shaped Windows NT Server into a leading multi-purpose operating system. IDC concludes: Windows NT will lead the OS market. This growth, IDC notes, will come at the expense of Unix and other operating systems.

PROOF IN PERFORMANCE

Market acceptance can be attributed, in part, to performance. In testing by Mindcraft Inc., Los Gatos, Calif., an independent test lab, Windows NT Server as a file server performed 25.5% faster than NetWare 5 when configured with out-of-the-box settings that customers can actually apply in real world environments. When performance is correlated to cost, Mindcraft found that Windows NT Server 4.0 provides 2.7 times better performance for the price *(www.mindcraft.com/whitepapers/nts4nw5filesvr.html)*. In Web performance tests Mindcraft found Windows NT Server 4.0 to be four times faster than Solaris 2.6 with its Web server and it offers 10.3 times better price/performance *(www.mindcraft.com/whitepapers/nts4sol26web.html)*.

Windows NT Server also enjoys widespread industry support from thousands of hardware vendors, independent software vendors, and support services companies. "There are over 200,000 professionals trained on Windows NT, more than with any other platform," says Microsoft's Nash.

Windows NT Server 4.0 clearly delivers. "The application we built for Snapper could not be built on NetWare," Connelly insists. The application for Windows NT was quicker to build and used less hardware than would be the case with other operating systems, and it is also more scalable and easier to administer, he adds.

→ *Continued on page 12*

SERVING UP APPLICATIONS

Windows NT Server takes business to the Web

At the heart of every business are applications that allow the organization to take orders, buy inventory, deliver goods and services, and perform a host of other activities.

An application server is a group of software services that support the creation of robust, scalable server applications, which are accessible from browser and non-browser clients.

Windows NT Server is widely accepted as a leading application server. Thousands of independent software vendors target their applications for the Windows NT platform. These vendors are taking advantage of the rich application services provided by features such as Microsoft Transaction Server (MTS) and Microsoft Message Queuing Services (MSMQ) in building n-tier distributed applications.

For example, MTS provides the services a Windows NT application needs to be distributed, secure, and transactional. With an easy-to-use programming model, MTS makes these application services available to mainstream developers, allowing them to spend more time on business problems.

As an application server, Windows NT Server enables the rapid development of applications. It provides a robust, secure transaction environment able to handle business-critical applications and offers messaging and queuing for interoperability. In the process, it delivers efficient database pooling and load balancing, ensuring that the organization gets maximum performance from its systems. All of this technology is unified by a single component model, making it easier to integrate and evolve applications. By capitalizing on the power of component-based application services, organizations can take their existing products and re-deploy them on the Web as Windows DNA (the Microsoft n-tier architecture) solutions easily by leveraging the application services in Windows NT Server.

BUILT FOR THE WEB With Web connectivity built directly in Windows NT Server, organizations can position themselves to tap into a rich and growing e-commerce environment. The integrated application services provided by Internet Information Server (IIS) in Windows NT lets organizations use the Internet to share information or provide rich Web-based application services.

For example, 1-800-Flowers Inc., Westbury, N.Y., a direct marketer of flowers and e-commerce pioneer, initially built its Web commerce system in-house. "When application services like MTS and IIS became available, we liked what they had to offer. We have been able to build an enterprise class Web site by leveraging the strengths of the Windows NT Server," recalls Donna Iucolano, vice president, interactive services.

The 1-800-Flowers Web site is built on top of the application services found in Windows NT Server and integrates with the back-end order processing and fulfillment systems, which are built on an Oracle database and run on the Unix platform. The company runs a mix of Windows NT and Unix servers. Says Iucolano, "Windows NT is a powerful platform for developing distributed applications. Our programmers can focus on the business tasks at hand because they have a seamless development environment based on the integration of Windows NT Server, the application services, and the development tools." Windows NT Server also provides a very scalable environment. "Our business is seasonal and Windows NT is also easy to scale up for peak times," Iucolano explains.

Similarly, barnesandnoble.com, the Web commerce arm of Barnes and Noble, adopted Windows NT Server for its platform and systems infrastructure when it launched its online business in 1997. The giant bookseller chose Windows NT Server 4.0 for its scalability and flexibility, notes Ben Boyd, vice president, communications.

Windows NT Server has proven itself. Barnesandnoble.com experiences 19 million page views on average each week. It has been cited as the third-largest e-commerce site. "Windows NT Server and its application services are the infrastructure that will take us into the future," Boyd concludes.

Although not every business is as engaged in Web commerce as 1-800-Flowers and barnesandnoble. com, the same application services that make Windows NT Server ideal for Web business also make it effective for intranet and extranet applications.

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- **Using Microsoft SQL Server 7.0 in a distributed, heterogeneous database environment**
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STICKING TO THE BASICS

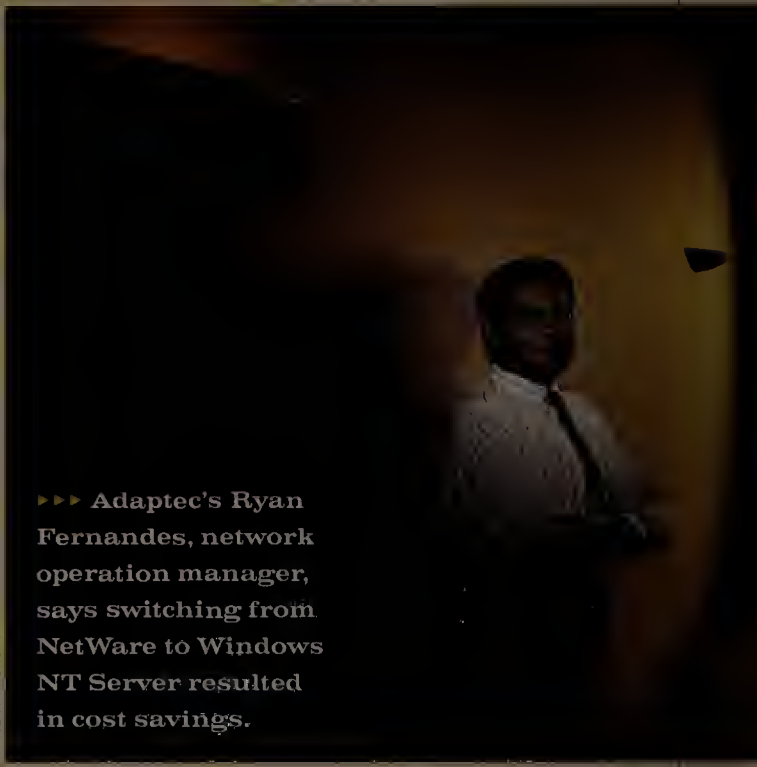
Windows NT Server stays true to its core

While it is the advanced features of Windows NT Server that grab attention, the multipurpose operating system continues to deliver efficient core networking services such as very fast and reliable file and print. The Windows NT Server file system (NTFS) is a highly scalable, easy to manage, secure file system for sharing files across an organization, regardless of the desktop system. Windows NT Server supports MS-DOS® and all 16-bit and 32-bit Windows-based clients, as well as Unix and Macintosh clients. It also works with other servers that may be on the network, such as NetWare and Unix.

Strong security is another core capability. "Windows NT Server offers the most robust and flexible security model of any general-purpose server or workstation operating system on the market today," asserts Microsoft's Nash. It includes such features as trusted-path logon and the Security Reference Monitor, which establishes a single place within the operating system for resource authorization services. This ensures that customers can lock-down their environment as they see fit.

Windows NT security, however, is flexible. Windows NT Server can be configured to favor user convenience over security, or to provide the high security that is often required by government agencies.

Windows NT Server also provides a core set of built-in services that form the foundation of basic management. Administrators can balance both centralized and decentralized control, ensure service availability and quality of service, and minimize cost of ownership. Windows 2000 Server will enhance Windows NT Server's management capabilities with the Active Directory, allowing administrators to manage system resources more easily and efficiently. Those are precisely the features that have Adaptec pumped up about Windows 2000 Server. Until last year, Adaptec relied on Novell NetWare as its primary file and print server, as well as for database and application serving. Adaptec switched to Windows NT Server, however, and the result was a savings in costs, reports Adaptec's Fernandes. The company anticipates even greater savings to come with Windows 2000 Server, he notes.



ANNE HAMERSKY

▸▸▸ Adaptec's Ryan Fernandes, network operation manager, says switching from NetWare to Windows NT Server resulted in cost savings.

← *Continued from page 9*

IDC states: "Windows NT is already a requirement for success among virtually all industry vendors." IDC projects Windows NT Server to surpass NetWare as the top installed server OS by 2000-2001. Looking ahead to clustered Intel servers, a new hierarchical Windows 2000 Active Directory, and other advanced features in the Windows 2000 operating system, it will only get better.

The same will likely be said for midsize organizations. Windows NT Server gives midsize organizations what they need to compete in the information-driven environment of the 21st century: a flexible, efficient, and open computing infrastructure based on Windows. ◆

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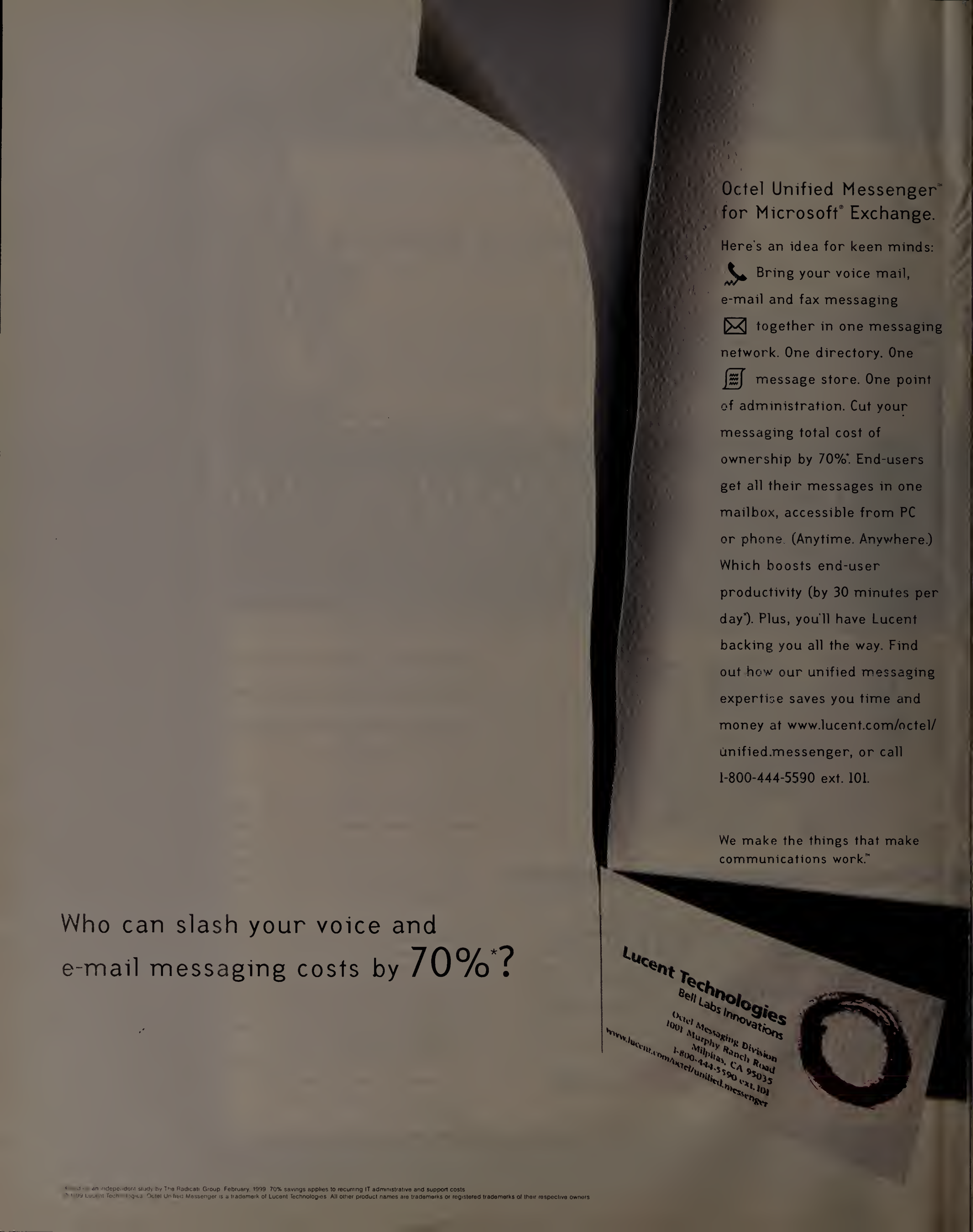

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BUSINESS

HIRING STRUGGLE

Signing bonus? Cash? Ho-hum. Then how about a BMW? That stunning offer brought one talent-starved IT shop two real gems. Most companies aren't that creative, but our research shows the hiring picture is still desperate — for the right skills, anyway. ▸ 56

SURVEY SAYS! IT PAY STILL RISING

Computerworld research shows IT salaries are continuing to rise, and information technology managers are still desperate for a few hot skills. Unless year 2000 changes something, the near future is bleak, according to David Weldon. ▸ 46

GETTING CLOSER TO CUSTOMERS

Manheim Auctions, which sells 8 million cars per year, wants to tie customers into its buying systems to cut expenses. But because many customers are unwilling to pay for new systems, Manheim Auctions is giving away 4,500 thin clients to help buyers link to its network. ▸ 41

RESELLING ADVICE

Consumers Digest rushed to the Web to keep start-ups from stealing its market. Then it found that other sites were willing to pay for its product recommendations to boost their own content. ▸ 36

BOOK REVIEW: GATES' IS SO-SO

Bill Gates wasn't impressed with the Internet in his first book. In his second, he talks about little else. Our reviewer found some nuggets but wasn't bowled over. ▸ 45

OVERSEAS Y2K WORRIES

Drug makers are on target with year 2000 repairs, but they rely on lots of foreign suppliers that might not be in such good shape. With help from federal agencies, they're making contingency plans. ▸ 38

FOCUSING RECRUITMENT

Recruiting on the Web produces lots of résumés, sometimes way too many. IT recruiters are narrowing their targets, using software that screens incoming résumés to highlight the best potential hires. ▸ 40

PRESENTATION PRIMER

Technical presentations, though important to their presenters, can be stupefying for listeners. We asked expert IT presenters for their techniques on how to make a technical presentation captivating. ▸ 54

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MICHAEL KREISER

THE BATTLE FOR YOUR FRIDGE

CAN A RETAIL SUPPLY CHAIN reach right into your kitchen? The day is coming when you can run out of milk at midnight, sweep the empty carton by a bar-code scanner on your refrigerator and have a fresh gallon on your doorstep by sunrise. Kenneth L. Robb of Brodbeck Enterprises (pictured) is among the pioneers pushing the grocery industry in that direction.

52

BRIEFS

Using the Internet To Do Your Job?

An international nonprofit group that advocates the commercial use of the Internet is teaming with a Web audience research company to measure how people at U.S. corporations use the Internet to help them do their jobs. The study will involve member companies of CommerceNet, a Palo Alto, Calif.-based Internet association of more than 500 companies, and will appear in Nielsen/NetRatings, the new Internet measurement service from Nielsen Media Research and NetRatings Inc. in New York.

A representative group of Internet users from each company will be followed, and the individual information will be aggregated in a way that preserves the identities of the individuals and their firms, the companies said.

Show Me That Internet Money!

Heidrick & Struggles Inc., a San Francisco executive recruiting firm, last week announced an Internet recruiting service called The LeadersOnline *(www.leadersonline.com)* for jobs in the pay range of $75,000 to $150,000. Candidates can join the site anonymously and will be notified via e-mail when a job that matches their requirements is posted. The company will also do background checks to verify the accuracy of candidates' credentials.

Net Investments

Internet spending continues to escalate, with manufacturers leading the way

PROJECTED CORPORATE SPENDING ON THE INTERNET	
1999	$85B
2002	$203B

PROJECTED 1999 CORPORATE SPENDING ON THE INTERNET BY INDUSTRY	
Manufacturing	$24B
Financial services	$16.6B
Online media	$10.7B
Retail	$6.2B

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM MASS

MAG FINDS LICENSING ADDS TO AD INCOME

Consumers Digest *sells its product info for use on other Web sites*

BY JAIKUMAR VIJAYAN

THE WEB is opening new revenue opportunities for Consumers Digest Inc. even as it threatens to undermine the company's print business over the long term.

The 40-year-old Skokie, Ill.-based private publication specializes in product evaluations and purchase advice on a wide range of consumer products, a market in which it competes with *Consumer Reports*, which is also publishing online.

"With the new media, we want to establish our franchise online to the same level we have in print," said Charles Mitchell, vice president and general manager of Consumers Digest.

Rather than just posting its data on a Web site for consumers, *Consumers Digest* is finding a major revenue opportunity in selling comparative consumer-product data for use by other companies at their own electronic-commerce sites, said Philip Jacus, Consumers Digest's Internet media manager. For instance, the company already has licensing agreements in place with Microsoft Corp. and Web software vendor Inktomi Inc., which will use the *Digest*'s Best Buy recommendations and product comparisons to draw surfers to their sites and keep them there.

The company also plans to make money with ads on its site, but for the most part, the print side will be the major revenue source, Mitchell said.

The risk of losing its market to existing competitors or online start-ups is great enough to justify aggressive moves on the Web, however.

"Our general feeling was that if we are not in that space, someone else would come in and compete" because a lot of people are looking for online product information, Jacus said. For example, *Consumer Reports*, which publishes similar information, already has a Web site, which offers some information free and the rest for $24 per year.

ALEX CLANEY/CONSUMERS DIGEST INC.

CONSUMERS DIGEST STAFFERS Thomas Casale, Philip Jacus, Charles J. Mitchell and John K. Manos (from left) are the brains behind the bytes

The Risks

Consumers Digest, which is making its own product evaluation and purchase advice available for free on the Web, risks cannibalizing its print sales, Jacus said. Currently, more than 1.2 million readers pay $15.99 annually to subscribe to the publication — which is also available on newsstands at $2.99 per copy.

"But right now, we can't be too worried about that . . . . We need to strengthen our [online] presence," Jacus said.

For *Consumers Digest*, any revenue erosion on the print side is likely to be "chicken feed" compared with the revenue potential from licensing data to other sites, said Michael West, an analyst at Gartner Group Inc. in San Jose, Calif. With online shopping sharply accelerating, consumers are increasingly looking for objective data from companies like Consumers Digest. In failing to do the same thing, the nonprofit *Consumer Reports* may not be aware "how valuable their information can be," he said. ◗

Hyundai Seeks to Boost Parts Sales 10% With Extranet

Dealers embrace easier ordering method

BY JAIKUMAR VIJAYAN

Executives at Hyundai Motor America are betting on an extranet that will link car dealers, auto parts distributors and independent repair shops via the Web to help boost declining parts sales.

The extranet should also help Hyundai build a database of information on third-party repair shops and customers, said Bernard Reyes, senior analyst of parts marketing at Hyundai in Fountain Valley, Calif.

The extranet will be formally launched on April 6.

Hyundai sold $120 million in spare parts last year. The company plans to boost that number by 10% as a result of the extranet, Reyes said.

The project could also allay consumer concerns about the availability of postwarranty parts and services for Hyundai vehicles outside the major cities, said Ted Evanoff, an auto writer for the *Detroit Free Press.*

Hyundai's extranet project complements a separate supply-chain project, in which it is building small warehouses for auto parts at its 50 largest dealerships to replace its three centers in California, Chicago and New Jersey [CW, Jan. 11].

Before, repair shops seeking information on the 35,000 separate parts Hyundai sells had to either use paper catalogs and microfiche documents or call Hyundai in New Jersey.

As a result, in many cases, repair shops tended to just go with third-party products that are usually cheaper but not always of the same quality as original Hyundai parts, Reyes said. "The major concern was to figure out a way to get that business back," he said.

With the extranet, registered repair shops and end users will be able to order vehicle parts from a free online electronic catalog that will then be fulfilled by participating dealers.

The extranet is much faster than catalogs or microfiche, said Kurt Hawes, parts and service director at Tom O'Brien Hyundai in Quincy, Mass. And with the Web site, "we are also privy to certain information — like keycodes, security codes and the status of an order — that we need for everyday operations," Hawes said.

Dealers and distributors — who pay $50 monthly to participate in the extranet — can also use it to order parts wholesale, check parts inventory and get order and account status information.

More than 40% of Hyundai's 470 dealers nationwide have signed up on the extranet so far, Reyes said. ◗

JUST THE FACTS

Hyundai's Parts Extranet

Challenge: To get repair shops to buy genuine Hyundai spare parts instead of third-party components

Approach: Make parts catalog and order information available via Web to repair shops and dealers

Why Hyundai hopes it will work: Quick access to product, price and order information makes it easier for repair shops to buy from Hyundai

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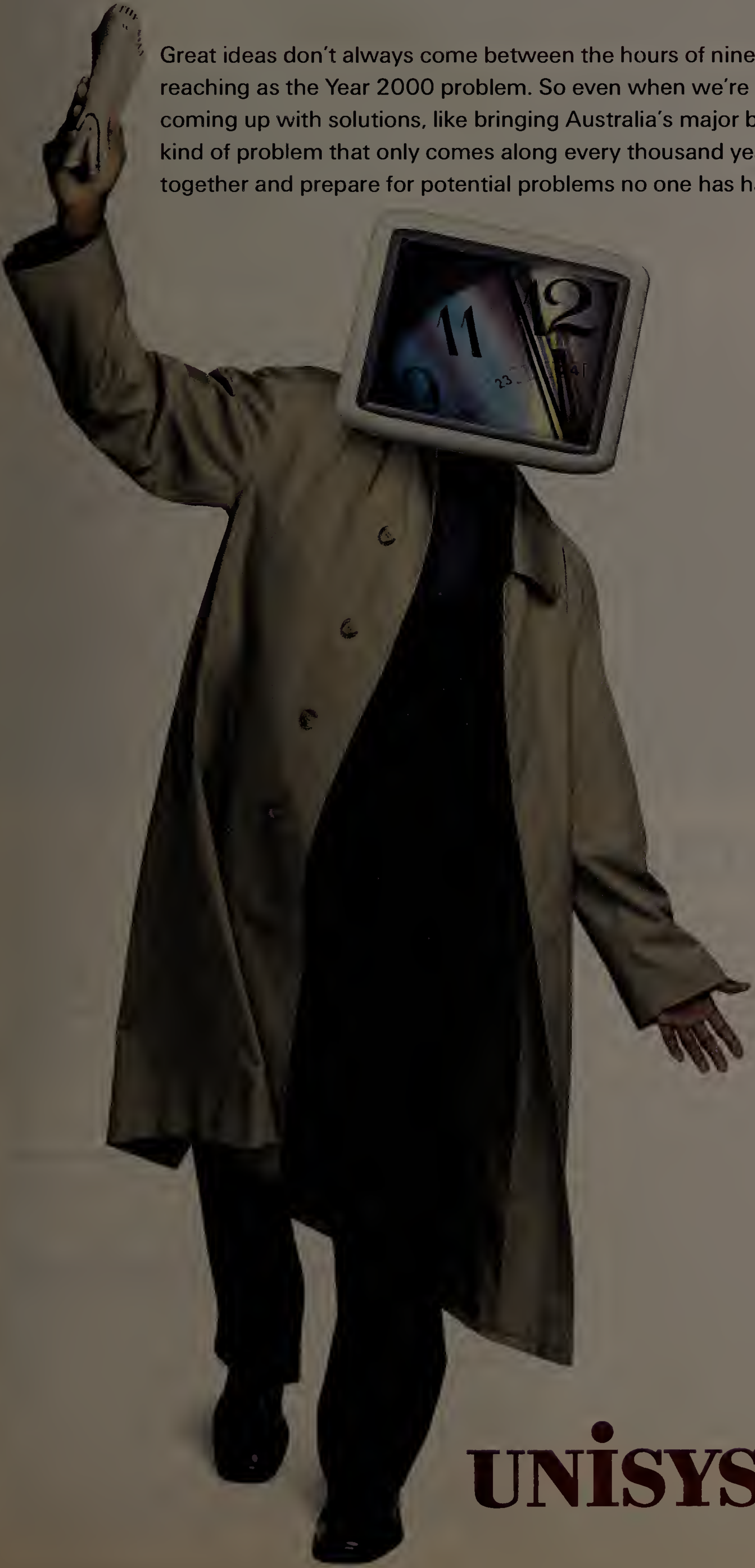

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BRIEFS

Y2K Progress

What percentage of your mission-critical applications are year 2000-compliant?

SOFTWARE Y2K-READY	RESPONDENTS
All ready	15.1%
99% to 75% ready	14%
74% to 50% ready	24.3%
49% to 25% ready	9.3%
24% to 1% ready	23.3%
All unready	14%

Base: Survey of 75 IT professionals, Q4 1998

SOURCE: CUTTER INFORMATION CORP., ARLINGTON, MASS

Bank Set on Y2K

Union Planters Bank reported that it has completed year 2000 testing and certification on its mission-critical systems, including its main processing system, its system that runs automated teller machines, wire transfer and others. The Memphis bank has been working toward year 2000 compliance since February 1997. Employees have spent 20,824 hours on it to date.

Compliance Tools For Small Businesses

The Massachusetts Business Association (MBA) and Horizon Information Group last week announced a joint campaign to provide year 2000 compliance information and tools to MBA members throughout New England. "The Smaller Business Year 2000 Guide" helps smaller companies address year 2000-related legal, financial and technological issues.

It's available at Amazon.com, Borders.com and www.higweb.com.

Global Y2K Site Debut

IDG.net, the online network of *Computerworld* parent International Data Group, last week announced the launch of a global network of Web sites dedicated to tracking computing issues and commentary related to year 2000. A network of six interactive sites in six languages, Year 2000 World will offer resources and content culled from IDG's 240 online publications.

The Year 2000 World sites will be published continuously through February 2000.

FOREIGN SUPPLY FAILURE WORRIES DRUG MAKERS

With raw materials at risk, companies consider adding inventory

BY STACY COLLETT

PHARMACEUTICAL companies have outpaced the rest of the health care industry in year 2000 preparedness, but the wild card will be getting the raw drug materials from abroad after Jan. 1, 2000, according to industry watchers.

About 80% of raw materials needed to produce drugs come from outside the U.S, according to the Senate Special Committee on Year 2000 Preparedness. For example, 70% of the world's insulin supply comes from Denmark.

More than half of U.S. drug companies are concerned about supplies from Asia and Japan, according to a survey by the Washington-based Pharmaceutical Research Manufacturers of America (PhRMA). They fear telecommunications and power sources will fail and curtail raw material shipments.

> If you're attempting to switch raw-material suppliers in countries . . . with Y2K problems, you could be hard-pressed to switch easily.
>
> KENNETH KLEINBERG, GARTNER GROUP

Bristol-Meyers Squibb Co. in New York has multiple sources of raw material suppliers as backup for any emergency, according to a company spokesman. But observers say switching to a new supplier in January 2000 could be difficult.

"If you're attempting to switch raw-material suppliers in countries where their bureaucracy is mired down with Y2K problems, you could be hard-pressed to switch easily," said Kenneth Kleinberg, an analyst at Gartner Group Inc. in Stamford, Conn.

The President's Council on Year 2000 Conversion is working with industry groups to determine how much inventory and raw materials drug companies should maintain.

Pharmaceutical manufacturers closely guard information about their inventory, but industry observers said most keep a one- to two-month stockpile of raw materials.

Drug Industry's Y2K Wild Card

What raw material-producing region most concerns you about year 2000?

55%	Japan/Asia
36%	Western Europe
27%	Eastern Europe
27%	South America
18%	Far East

Base: Survey of 24 drug companies; multiple responses allowed

SOURCE: PHARMACEUTICAL RESEARCH MANUFACTURERS OF AMERICA (PHRMA)

Once drugs are produced, wholesalers and retailers keep two- to three-month supplies of the products themselves.

"If we determine there is a need, we're planning to adjust our inventory levels. We'll make that decision a few months prior [to year 2000], and it wouldn't be for all medicines," said Tracy Stenn, a spokeswoman at Merck & Co. in Whitehouse Station, N.Y.

Merck's most popular drugs include Zocor, a cholesterol-lowering medication.

PhRMA estimated that two-thirds of U.S. drug makers have completed year 2000 work on all software applications.

Most of the health care industry, in comparison, has just started testing mission-critical systems, according to Gartner Group. ◗

Russia Reneging on Y2K Plan?

Kosovo bombing puts cooperation at risk

BY JAMES NICCOLAI

Russia's defense ministry reportedly has said it will cease cooperating with the U.S. on preparations for possible year 2000 computer problems — apparently in a show of protest over NATO's military intervention in Kosovo, Yugoslavia.

Government officials in Russia and the U.S. last week wouldn't confirm the reports, published by a variety of media outlets.

The two countries have been developing a proposal to station officials at each other's nuclear facilities during the months before and after Jan. 1, 2000, with the goal of preventing any false alarms if a software problem in an early warning system indicates that a nuclear strike has been mistakenly launched. The countries are also involved in an effort to make computers at several Soviet-designed nuclear plants throughout Eastern Europe year 2000-compliant.

The U.S. Senate Special Committee on the Year 2000 Technology Problem, along with several other U.S. government offices contacted, said it hadn't received official notification of Russia's actions.

An official at Russia's Ministry of Foreign Affairs also couldn't confirm or deny the report but did say that he found the situation highly unlikely. "I think that the development of year-2000 cooperation may [ultimately] depend on the situation with the Kosovo crisis. But for the moment, any disruption of our cooperation in this area would not be constructive," the official said.

"We have to tread lightly because of U.S.-Russian differences over Kosovo, but when the dust settles, we'll do our best to resume the Y2K effort," said a spokesman for the Senate's year 2000 committee. ◗

Niccolai writes for the IDG News Service in San Francisco. Computerworld's *Tom Diederich contributed to this article.*

SNAPSHOT

Competitor Comparison

How year 2000-ready **are** *the nation's top three pharmaceutical companies' internal systems?*

COMPANY	STATUS
Merck & Co.	Expects all critical aspects of year 2000 work to be done by the end of the third quarter.
Johnson & Johnson Inc.	Anticipates all work on internal systems to be done by the end of the third quarter.
Bristol-Meyers Squibb Co.	Expects to finish major work, substantial completion of contingency plans by middle of the year.

*Johnson & Johnson reported $120M in costs so far, predicting a total cost of $250M. The others said year 2000 costs won't impact finances.

SOURCE: COMPANIES' MOST RECENT FINANCIAL FILINGS WITH SECURITIES AND EXCHANGE COMMISSION

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While **e-customers** present endless opportunity, they do pose some challenges. Managing relationships with customers, prospects and partners online is an enterprise-wide task. Systems performance and scalability needs are key. In short, it's got to be done right. Shrink-wrapped solutions will fall short. Experienced partners with customizable products and old-fashioned follow-through will succeed.

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RECRUITERS WHO USE WEB TIGHTEN FOCUS

Take a more targeted approach to avoid getting inundated with résumés

BY BARB COLE-GOMOLSKI
NEW ORLEANS

WHEN IT comes to Internet recruiting, casting the widest net may not be the best way to harvest IT talent.

Hiring managers gathered here for a conference on information technology recruiting said the smartest companies are taking a targeted approach to Internet recruiting.

Recruiting on the Web has jumped in recent years because it's inexpensive compared with print advertising or headhunters. According to the American Management Association in New York, 59% of companies currently post jobs electronically, three times as many as two years ago.

But hiring managers who post openings on several Web-based job boards can be inundated with responses. Several IT recruiters said it's common to receive 50 to several hundred résumés per day from a handful of job postings on large job sites.

"Then it becomes labor-intensive, and your costs can go sky-high," said Reginald Barefield, executive director of talent at Humana Healthcare in Louisville, Ky.

To do a better job of prescreening résumés arriving in response to Web ads, Humana developed an agent using a tool from Reticular Systems Inc. in San Diego. Based on criteria defined by Humana, the system ranks the résumés in order, from most likely to match the company's requirements to least likely to match.

Most Internet recruiting sites let users search their contents. But just like Web search engines, the quality of searches is variable, users said.

Barefield said he believed Humana's more focused approach helped the company hire 5,500 workers through the Web and traditional methods last year at a cost of about $12 million, compared with 3,100 workers in 1997 at a cost of $23 million.

Tellabs Operations Inc., a manufacturer of phone switches in Lisle, Ill., also recently tweaked its Internet recruiting plan. It started out posting jobs on its own site as well as on several large job boards. Just

Web Sites for the Casual Job Seeker

Some Web sites have cropped up that link IT professionals who may not be actively job-hunting to potential employers.

Hiring managers said the Web sites are promising because their content could lure "passive" job seekers. Earlier this month, RIT Systems Inc. in Minneapolis launched techies.com, which so far features jobs in seven cities (Austin, Texas; Dallas; Denver; Phoenix; Portland, Ore.; Seattle; and Minneapolis/St. Paul).

It also offers information about salaries and training classes, career planning articles and reference materials.

Separately, Boca Raton, Fla.-based Consultis Inc. has rolled out a recruitment section on its Web site (*www.consultis.com*) aimed at uniting IT professionals with contract engagements and full-time jobs.

And Louisville-based TechRepublic in May will launch TechRepublic.com, a site that will include job postings and career management content. – *Barb Cole-Gomolski*

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by doing that, Tellabs was able to fill about 10% of its openings, but that meant sifting through a lot of duplicate résumés and spending time on unqualified applicants.

In January, Tellabs installed software from World.hire in Austin, Texas. It allows both applicants and employers to specify criteria, such as salary and willingness to relocate, on a Web site. Applicants may sign on to the site anonymously, and the software will continuously search for applicants that match new job openings, sending e-mail to the applicant when a post becomes available.

And though many companies are turning to new software to refine their Web recruiting plans, some companies are just being more picky about where they post jobs.

"It's quality, not quantity," said John Kendozior, an IT recruiter at Harvard University in Cambridge, Mass. ◗

Thin Clients Pull In Car Customers

Auto auction company eyes move to Web

BY STACY COLLETT

MANHEIM CIO Richard Deckard: Move will modernize, cut costs

In the auto-auction industry, a narrow road divides the tire-kicking buyers of today and the "cyberlot" buyers of tomorrow. So industry leaders are revamping their information technology infrastructures to bring Web capabilities to the auction house.

Of the 35 million used cars bought and sold each year, about 8 million wind up on the auction block at Manheim Auctions Inc., according to the National Auto Auction Association (NAAA) in Frederick, Md. Atlanta-based Manheim works with automakers to sell previously leased cars to rental agencies or used-car dealers.

Manheim is replacing 1,600 PCs and dumb terminals with 4,500 thin clients at 63 auction sites (hardware cost: $5.8 million). The network stations will give users access to accounting, car registration, inventory and reconditioning information on each car via the Web.

Manheim executives said car sellers will also benefit. "Clients can look at the status of all their vehicles at any period of time. [They] don't have to build up their IS department and software packages to manage their business" because Manheim manages inventory and repair of the cars for them, said Richard Deckard, vice president and CIO of Manheim Auctions.

Officials said Manheim will also save time and money by using the IBM AS/400 it already had with the thin clients. To modernize the server, the auctioneer added e-mail capabilities and word processing and spreadsheet applications. Deckard said the company will also be able to centralize systems management and reduce long-term computing costs.

Competitor ADESA Auctions Inc. in Indianapolis installed thin-client workstations at its auction sites more than a year ago. About 1,000 users have access to mission-critical applications and e-mail but have limited access to the Web right now, according to one IT employee who asked not to be named.

While ADESA and Manheim are testing having buyers view the autos online at the Manheim.com and Adesa.com Web sites, industry watchers said only a small portion of used cars will be purchased sight unseen.

"This has been a tire-kicking industry, and in large measure it remains that. But a portion of nearly new vehicles that are 1 to 3 years old and in the $30,000 range can go from an auction block to the front line of a car dealer [with minimal repairs]. Those cars can be sold on the Web," said Peter Lukasiak, executive director of the NAAA. ◗

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Legislation Would Let Companies Sue Database Pirates

BY PATRICK THIBODEAU
WASHINGTON

The U.S. Congress is again considering a bill that would protect databases from pirates who copy and then resell the contents as their own.

The bill is intended to help companies that build databases from material collected from public sources that can't be copyrighted, such as government reports or product information released by companies. The legislation would give those database makers the ability to sue database thieves.

A House Judiciary subcommittee recently held a hearing on the bill, the proposed Collections of Information Antipiracy Act, which is awaiting committee action. Its outlook is favorable: The House approved a similar measure last year, but the bill died when the Senate failed to take it up before adjournment.

One database maker seeking passage of the bill, Doan Agricultural Services Co. in St. Louis, said a book it published listing agricultural officials was copied and put on a Web site. Doan determined its material was copied because an error in its listings was duplicated exactly, said Harry Gerhart, executive vice president.

The Web site, which was charging officials who wanted to expand their listings, withdrew the list after Doan protested, Gerhart said.

Ambiguous Ruling

But database developers say their legal protections have been unclear since a 1991 Supreme Court ruling prevented companies from copyrighting factual databases that aren't sufficiently original. Prior to that ruling, companies such as Micromedex Inc. believed they were protected under the "sweat of the brow" concept — an idea derived from previous case law that extended legal protection to people who assembled databases.

"I think there is uncertainty right now as to what's copyrightable," said Marilyn Winokuk, executive vice president at Micromedex, an Englewood, Colo., publisher of a database on poisons that has more than 1 million entries.

The bill is garnering opposition from some academic groups and libraries, who say it would create new license burdens and hurt unfettered access to factual data. "The traditions in the country have been built on protecting expression, not protecting investment, and this legislation seems to move us in a very different direction," said James Neal, dean of libraries at Johns Hopkins University in Baltimore.

Charles E. Phelps, provost at the University of Rochester in Rochester, N.Y., has similar reservations, but said he believes that there's room in the bill for "a reasonable compromise." ▶

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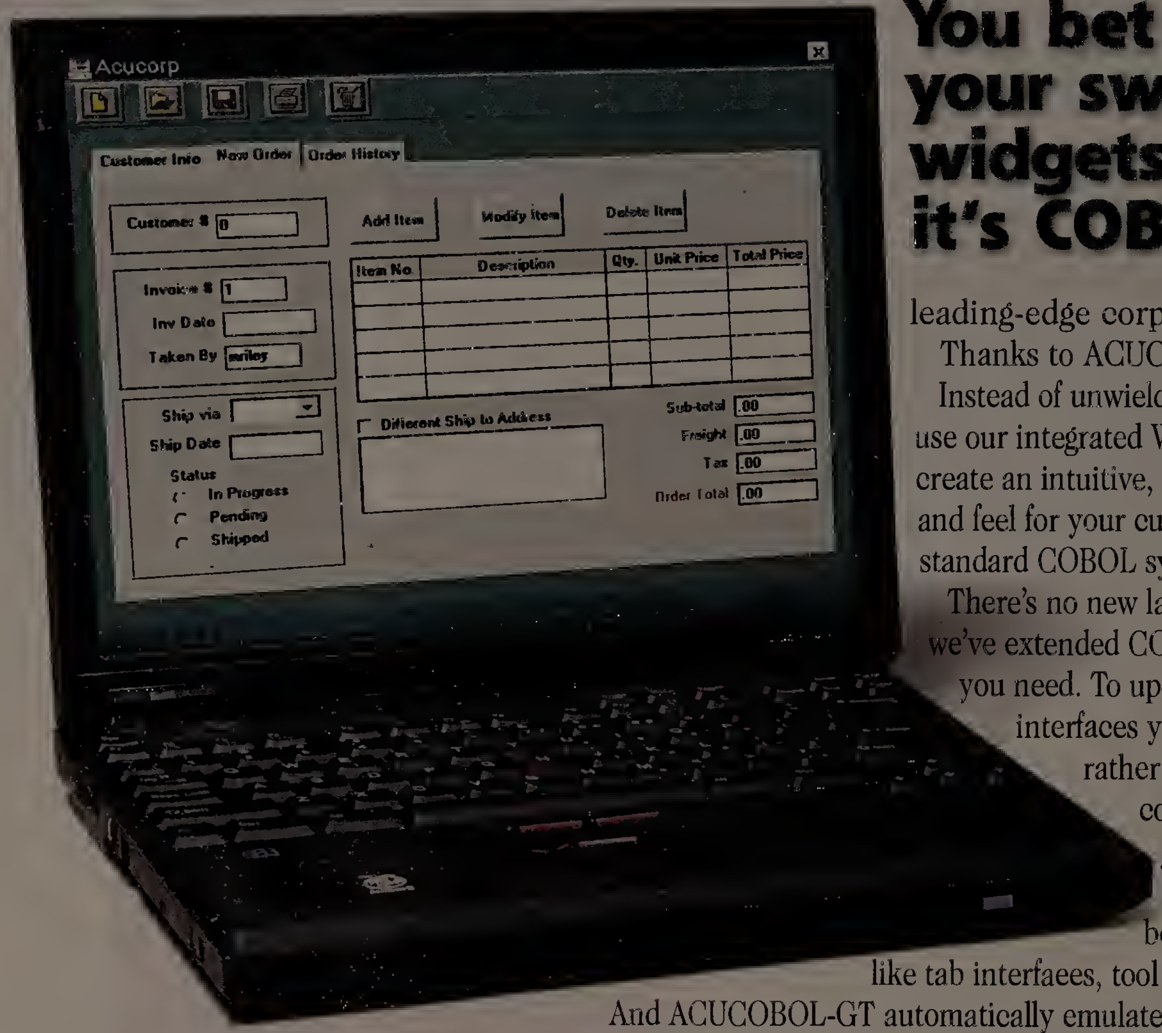

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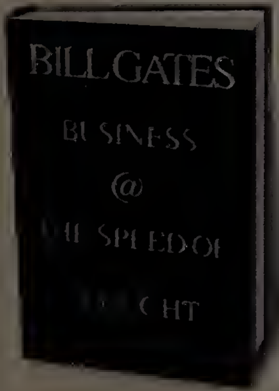
BOOK REVIEW

Gates' Book Offers Basics of Net Business

BY KIM S. NASH

Microsoft Corp. CEO Bill Gates' new book reveals a bit about how his software empire works but says nothing about what got the company into antitrust trouble with the U.S. Department of Justice.

Rather, Gates presents *Business @ the Speed of Thought* ($30, Warner Books, New York) as a primer for other CEOs about how they can best use the Internet to grow and change their businesses.



Gates weaves his ideas about tying together a company's information sources into one electronic circuit accessible by everyone into 12 steps for building a "digital nervous system." He advises, for example, that all internal communication should flow through e-mail to ensure that news gets out fast.

Of course, Gates has been touting the digital nervous system concept for at least a year. And he has a vested interest in promoting the notion that companies should computerize everything.

Examples: Do your digital systems enable you to learn about bad news anywhere in the company and communicate it quickly? (Microsoft's do, he claims.) Each year, do you spend a smaller percentage of resources on keeping systems running and a greater percentage on new business solutions? (Here, too, Microsoft is in the upgrade business, so it isn't surprising Gates would push this idea.)

As much as the book hypes Gates' digital nervous system concept — he uses the term eight times in the first chapter alone — it does offer some basic tenets that busy information technology managers may have forgotten.

For example, Gates says to look within to figure out business process changes. "If a consultant can find trends in your data that you can't, there's something wrong with your flow of information," he writes. Makes sense.

The book also contains some fresh user case studies that show how to make the Internet work for you. Marriott International Inc., for example, in 1997 was one of the first companies to create a Web site that went beyond brochureware. It let users search for hotels with different amenities. The hotelier won't get specific but says Internet guests pay a higher average room rate than others.

Overall, *Business @ the Speed of Thought* is a well-written refresher for smart IT leaders about some fundamental computing truths. But don't pay retail. Amazon.com and Barnesandnoble.com offer it online for a discounted $18. ◗

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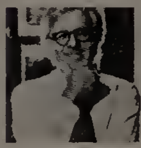

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NEW REPORTS

Working Harder

*How many hours do you work per year?**

	1997	1998
U.S.	1,908	1,940
Non-U.S.	1,846	1,851

Base: Survey of 460 IT professionals
*Based on 50-week year

SOURCE: META GROUP INC., STAMFORD, CONN.

Why Companies Implement ERM

In "Enterprise Resource Management (ERM) Solutions and Their Value," Meta Group Inc. compares user satisfaction with seven leading ERM vendors, including Oracle Corp. and SAP AG.

The survey shows how 63 corporations implemented ERM to improve decision-making, ordering practices and other functions. It also explains how to estimate costs, challenges and benefits of implementing such systems.

The report costs $2,500.
www.metagroup.com

Removable Storage Use Up

More users are buying high-capacity removable storage devices like Zip drives, but the trend is still toward adding them after buying the PC, according to International Data Corp. (IDC).

IDC's "U.S. Removable Magnetic User Survey, 1998" found that only 10% of commercial respondents purchased a removable magnetic drive, such as Iomega Corp.'s Zip, at the time of PC purchase. When the same respondents were asked if their PCs currently had such a device, the response rate doubled.

Reasons for adding one later included a need for incremental, fast-access storage as well as a data-interchange tool.

The report costs $1,500.
www.idc.com

Internet Insecurity

In "The 1998 Internet Security Survey," IDC predicts that the growth of electronic commerce will spark an increase in the amount information technology executives spend on security software and services.

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NEW BOOKS

Two Titles Look At Outsourcing

In *Insider Strategies for Outsourcing Information Systems* (Oxford University Press, 288 pages), Kathy M. Ripin, a consultant, and Leonard Sayles, a professor emeritus, offer guidelines to help managers understand information technology outsourcing myths, avoid blunders and find the right outsourcing partner.

The book includes case studies of three successful outsourcing arrangements and chapters on leadership, managing change and project turnarounds.

Outsourcing: How to Make Vendors Work for your Shareholders (NDMA Publishing, Ridgefield, Conn., 106 pages) is N. Dean Meyer's fifth book.

In it, the organizational design expert offers a 10-year retrospective on the successes and failures of outsourcing.

The book also provides guidelines to determine when outsourcing is appropriate and when it's nothing more than simply throwing money at one problem while creating others.

DAVID WELDON

Money still talks

I'VE DECIDED that the year 2000 problem may just be the best thing to hit IT managers. Seriously. The way I figure it, the millennium is your best (pronounced ONLY) hope of putting the brakes on skyrocketing salaries, ever-widening skills gaps and large-scale staff desertions to contracting. Pray it's all so, because otherwise, you can expect another dismal year on the staffing front.

Here at *Computerworld*, we're knee-deep in the latest findings of our IT hiring, salary and satisfaction projections. We have fresh data on who IT managers hope to hire this year, what skills you still can't find, what you're paying your staff, how much consulting firms are paying their consultants and how the IT rank and file feel about everything you're doing to them — and for them.

If you're an IT manager, the news isn't encouraging. If you're an IT professional, these are still the best years of your life.

Take salaries. They're still rising at record rates. By the end of the year, they could reach double-digit increases again for many key job titles, according to *Computerworld*'s first Midyear Salary Survey, published last week. The fact we even published a midyear salary survey reveals how fast — and how far — IT salaries are rising. Managers told us they needed more frequent benchmarks on what the market is paying. You may be sorry you asked.

> *Salaries and bonuses drew the highest levels of dissatisfaction.*

We've entered another year of skyrocketing paychecks. And that's a break in tradition, according to what we've found during the 13 years we've been tracking IT salaries. Historically, IT salaries jump sizably once every three to four years, then immediately level off. It's a continual game of catch-up. Then, as pay rates fall a bit behind other job areas in the company, the IT market adjusts itself again and spikes salaries upward.

The rules no longer apply. A year and a half ago, we reported an average salary increase of 11% in a single year for IT professionals. Such an increase was unheard of. Some said it was long overdue. Others said it was insane. Most of you apparently agreed with the latter, sending a very loud message through our Annual Salary Survey last fall when you said, "Enough is enough."

Your staff has news for you: It isn't enough quite yet.

Quick on the heels of our Midyear Salary Survey, you can look forward to our Annual Job Satisfaction Survey in the April 19 issue. Pay close attention to reports of how your staff feels about their salaries and bonuses. Of the nearly two dozen benefit-and-compensation issues we polled IT professionals on, those two drew the highest levels of dissatisfaction.

Especially unhappy is the under-25 crowd. A full 40% of them tell us they're dissatisfied with their salaries, and 50% vote thumbs down on their bonuses. And in both categories, women at all age levels are more dissatisfied than men. No surprise then that salary is still the No. 1 reason your staffers jump ship.

We also asked our online readers this year to participate in the Annual Job Satisfaction Survey. Early results tell an identical tale: The highest levels of dissatisfaction revolve around salary, bonuses and the connection between employee pay and performance.

And what factors, if improved, would most increase your employees' satisfaction? Salary increases top the charts, followed by performance bonuses. And here you are thinking you were finally making headway.

But don't think all the news is bad. Our projections do show a silver lining. Many IT managers expect hiring needs to slow this summer. The top reasons: the winding down of year 2000 projects and a reduced need for contractors. That will put more IT professionals on the job market, narrow the supply-and-demand gap and ease the salary squeeze.

No doubt you're finally saying, "Thank God for year 2000." ◗

Weldon is Computerworld's *senior editor/IT careers. You may contact him at David_Weldon@computerworld.com.*

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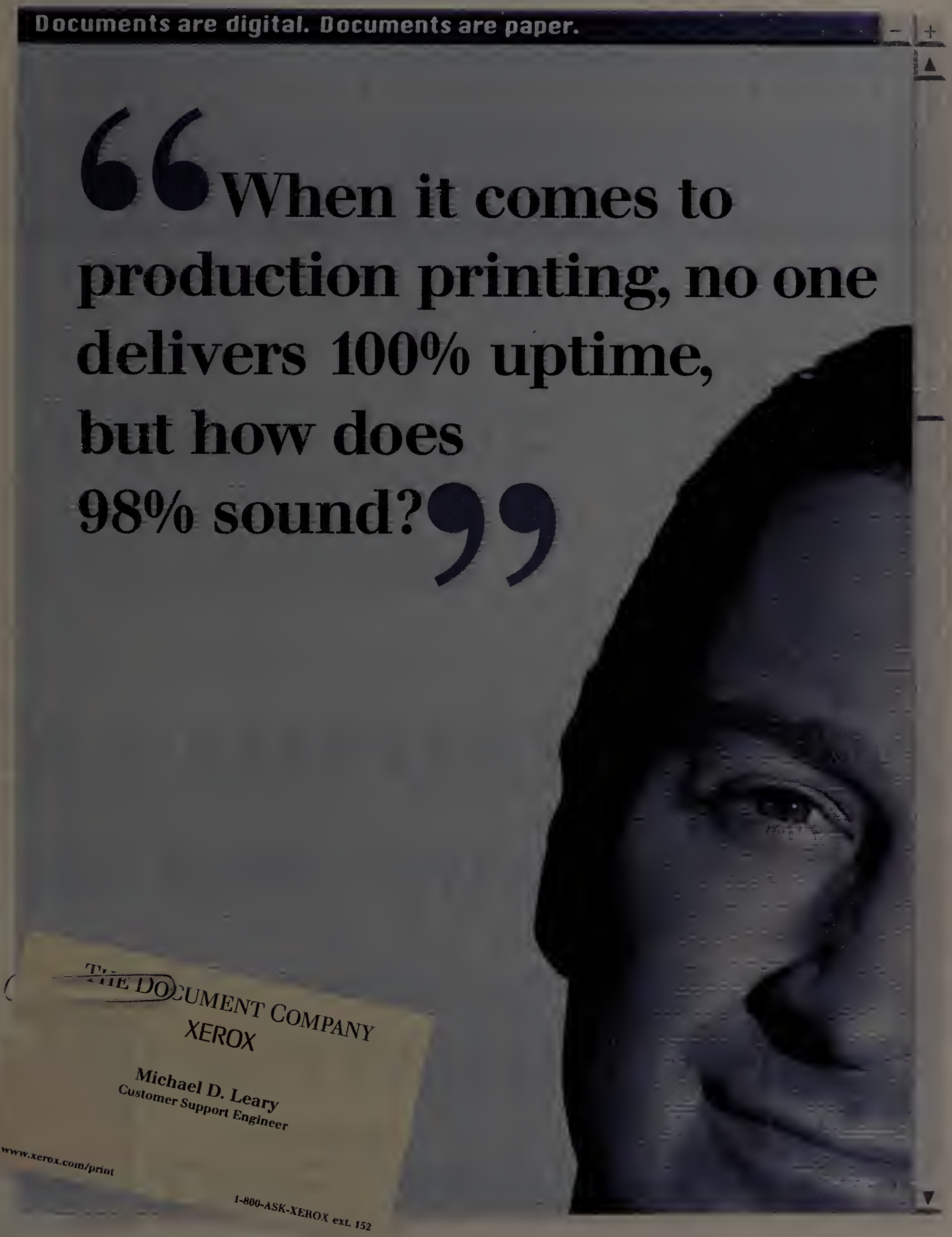
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Fatal Career Moves

The top 10 career-inhibiting mistakes you're probably making right now

BY MICHAEL COHN

DON'T LISTEN TO HEADHUNTERS. Don't believe the want ads. Sure, opportunities abound. But in information technology, there's never room at the top. The apex of the org chart is a skinny place indeed. So if you want to get there, or at least move up a box or two, you have to stop making boneheaded career mistakes.

You've probably made a bunch of them this week. You could be making one or two right now! Stop it this instant! Stop doing the career-inhibiting stuff below or spend the rest of your life making $38,500, while the guy in the next cubicle somehow spends half his time electronic trading but is still about to edge you out for that team leader spot.

SORRY - I COULDN'T GET AWAY! HUGE SYSTEM PROBLEM DOWNSTAIRS- HAD TO GLUE IT TOGETHER!

EVA EMMERT

1. Punctuality

Stop it. Punctuality can kill a career faster than a clip-on tie. Punctuality means you don't have enough to do. You have time to get organized. To be on time. To start thinking about that 2:00 meeting at 1:45.

Bad move. Be late! Ten minutes at a minimum. Twenty minutes if it's *your* meeting. "Sorry, I couldn't get away. Huge system problem downstairs — had to glue it together." Lateness can be darned impressive. Of course, the latest person to the meeting always one-ups everyone else. Me, I usually try to show up about 15 minutes after a meeting ends, just to be safe.

2. Not Having a Whiteboard

Get one. Even a tiny cubicle needs a big whiteboard. And every week or so, put something impressive on it. A data model. A chart with everyone's name. A barely comprehensible network design. A couple of city abbreviations, a bunch of boxes and an assortment of arrows in between will make people think you're working your tail off — even if you've spent the whole week proofreading just four lines of job control language.

And if you really want to make a splash, when you come up with one of those diagrams that really has socks-knock-off potential, slap on a big DO NOT ERASE across the top. That means you're finally done ... with what, no one will have a clue.

3. Nonflashy Title

We all need database administrators. We can't survive without WAN architects. But to the CEO, those titles are just a bunch of acronyms. To the chief financial officer, such positions aren't impressive enough to warrant salaries higher than room temperature. To be a success, you need a flashy title.

Face it — "junior programmer" doesn't cut it in the boardroom. Now junior programmer *II*, there's a title that'll get an executive's attention.

4. Marketable Skills

Stay away — far away. Java may seem like the way to get ahead. Those Object guys only look like they're pulling down the big bucks. If you've got technical talent, you're cooked. Pigeonholed. You're too valuable to move up the management chain.

My advice: Look dumb. Enterprise resource planning expertise could keep you on that bottom rung for the next 15 years ... or until you finish phase one of the implementation, whichever comes first.

5. The Wrong Tools

If you ever find yourself meeting around the mahogany table with the big cheeses, the last thing you should do is start furiously taking notes in some 79-cent spiral notebook.

Get the right tools! One of those handheld do-hickeys is a guaranteed head-turner. Put an end to fumbling with impenetrable three-ring binders or scribbling with dime-a-dozen office pens.

Instead, calmly remove some glowing object from your shirt pocket and poke and prod it with your stylus. Just having a stylus is career-advancing. It's the way you show you're king of your own information domain, even if the only meeting notes you're taking are to remind yourself to pick up the team bowling shirts.

6. Clear Communication

Doesn't help. Communication skills are the death knell of your career. Be confusing. Obfuscating. Speak in acronyms and clichés. A few unintelligible abbreviations can make you darned promotable. "Hey! I need that FTITM!" (first thing in the morning). "I just heard the SDA" (system's down again). "Somebody get me a TSOR!" (tuna salad on rye).

7. Optimism

"Yes" should be stricken from your vocabulary. "That'll never work." Now that sounds brilliant. Make sure you act like you know something that your co-workers don't know — like the project's going to be killed (it usually will). Or act like you know someone is leaving (someone usually is).

Positive attitudes get you nowhere. Team players stay smack in the middle of the team. But a couple of irritating "I told you so's" ... that's the way to make it to the top.

8. Poor Location

You need to work in the right place. Being in that multinational hub, the global pulse, the brain center of the organization can advance your career. Being in the last cubicle on the left in the annex of the soon-to-be-closed satellite office might not be the most career-visible spot.

Work where you're noticed! If that fails, head to the West Coast — at least there you have a couple more hours before year 2000 hits.

9. Staying in Shape

Embrace stress. Consider smoking. Put on a pound or two. Physical fitness can kill your career. Executives need to be on the edge. Bloated. Bloodshot eyes. Cholesterol tipping the scales. You can't crack the silicon ceiling if you're lean, calm and tan. No one trusts a washboard stomach. To be like them, look like them! You'd be amazed how a meat-lover's pizzas or two each week can really give you a leg up, albeit a fleshy one.

SORRY - I DIDN'T GET IT! LOOK, I'VE GOT 73 UNREAD E-MAILS!

10. Keeping Up With E-mail

Stop reading it. Stay *un*informed. You can't get back to people. You can't look like you have time. "Sorry, I didn't get it. Look, I've got 73 unread e-mails. I probably got nine more while I'm sitting here talking to you." You must really be somebody if you're too important to read your e-mail. Either that or you forgot your password. ▶

Cohn is a computer consultant in Atlanta.

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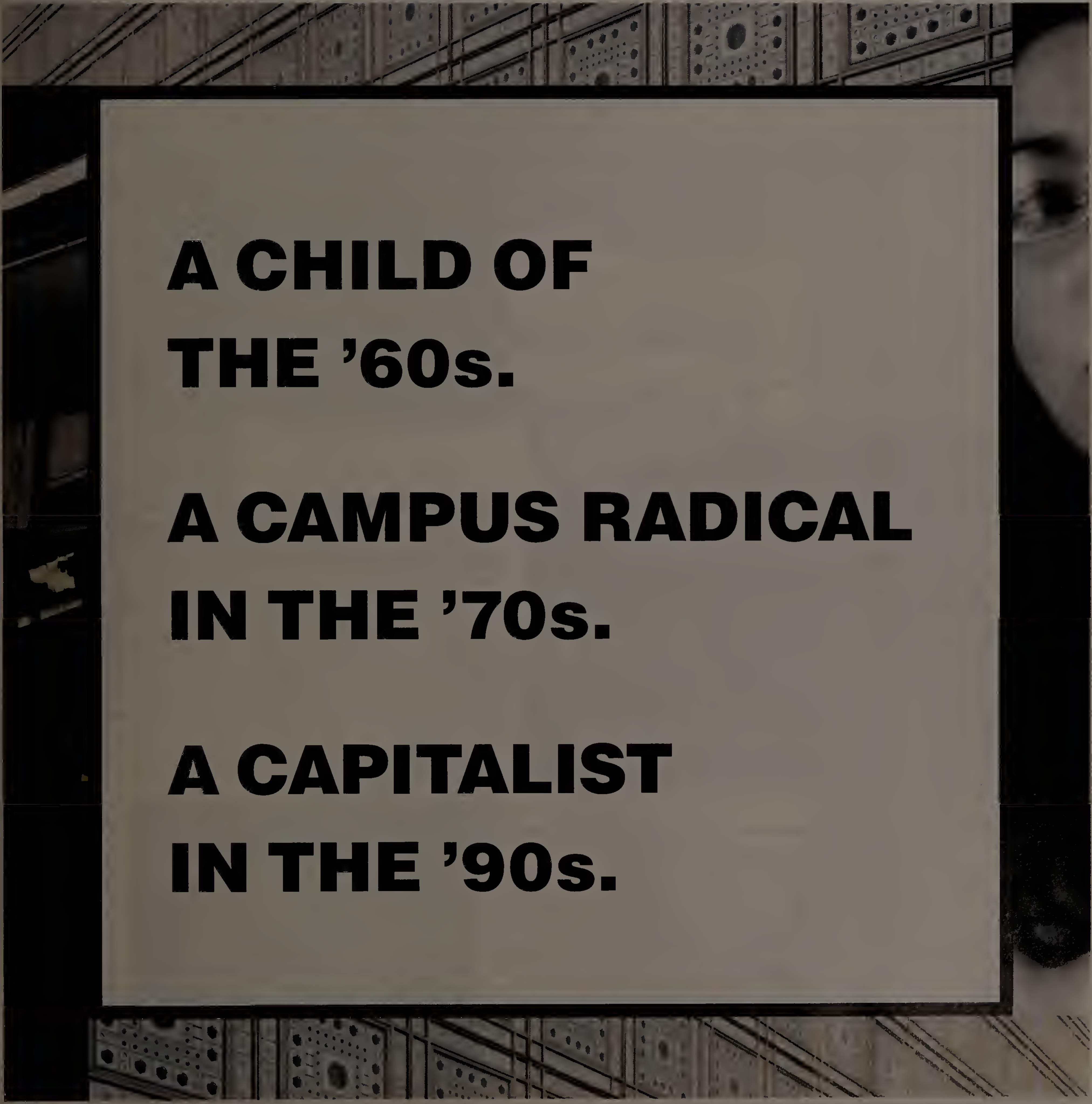
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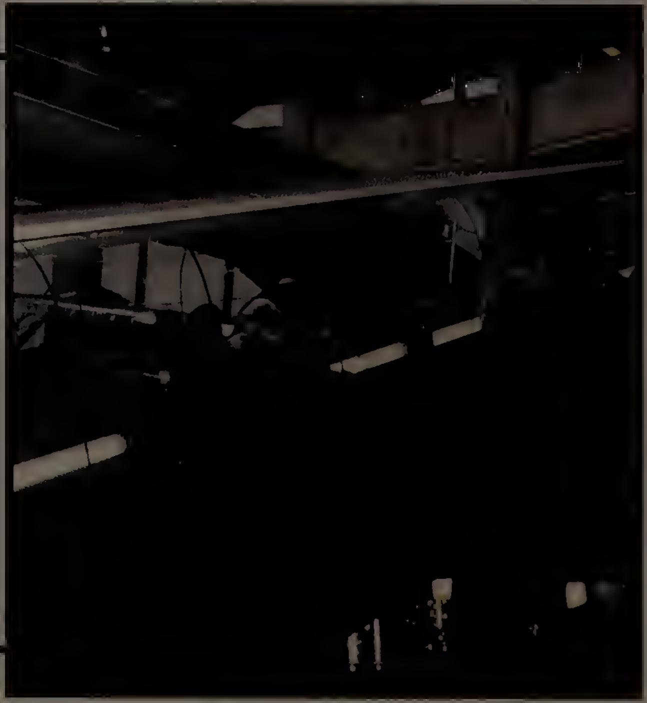

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THE BATTLE FOR THE FRIDGE

Automatic inventory replenishment in your kitchen? It's only a matter of time – the food and grocery industry is looking to hook up your home to the supply chain.

By Alice LaPlante

YOU'RE about to pour the last ounce of milk into your late-night bowl of cereal. Oops — looks like there'll be none left for your morning coffee! All the stores are closed. What's a hungry night owl to do?

Pour away. By 6 a.m., a new gallon will be on your doorstep, thanks to a microchip sensor embedded in the milk carton and transmitted to an Internet device on your kitchen counter.

It's the latest battle in cyberspace. And it's coming soon to your refrigerator. Grocery manufacturers, supermarkets and online grocers are scrambling to figure out how to leverage emerging technologies so they can place their products directly in your home. By offering enough convenience and time savings, they hope you will remain a loyal customer.

What's information technology got to do with this? Everything.

CIOs in the grocery industry are putting in the proper technical infrastructure to collect and consolidate customer data. New point-of-sale systems that interact with fledgling Web-commerce ventures, coupled with new database mining tools, are letting companies analyze customer behavior to an unprecedented degree.

Look at the "intelligent" refrigerator that Frigidaire Home Products debuted last month. Equipped with a microprocessor, touch screen, bar-code scanner and communications port, the refrigerator — developed by Frigidaire and ICL, a London-based technology company — allows consumers to automate their grocery shopping. Whenever someone is low on a given product, they simply swipe the carton past the refrigerator's bar-code scanner, which adds that item to a list. When the consumer is ready, the list can be transmitted to the local grocer. The groceries will either be delivered to the consumer's door or packaged for pickup. The fridge can be connected to the Internet via a standard phone line or to an Ethernet network.

Although this particular product is a prototype, the concept has been technically viable for some time, says Jeff Smith, managing partner of electronic commerce at Andersen Consulting's Global Food Practice in Detroit.

What Andersen dubs "the consumer response model" to grocery shopping would encompass many activities — including automatic replenishment and online purchases delivered to the home or picked up at the store.

We've already seen preliminary steps toward a more customer-focused food chain: So-called smart cards that can be swiped at the checkout counter for quick, coupon-less savings; electronic coupons that can be automatically credited to shoppers' bills the next time they come to the checkout counter; Internet grocery delivery services such as Peapod Inc., NetGrocer Inc. and Streamline Inc. that allow you to submit your grocery order and specify delivery instructions online [CW, March 29].

One possible next step, of course, is not even having to ask for groceries. Your pantry, refrigerator and bathroom cabinet could be filled automatically and immediately with the help of bar-code readers in your home like those used by warehouse workers, says Stephen Craig, a manager at A. T. Kearney Inc., a consulting firm in Alexandria, Va.

Industry participants are quick to caution that that's just one scenario.

"There's a very important message to hear: These are not mass-market issues," Smith says. "We're talking about micromarkets or solutions designed to fit the very specific needs of specific kinds of consumers." Cultural, cost and lifestyle factors will determine which technological option is right for each household, he says.

Take Brodbeck Enterprises Inc.'s Dick's Supermarket (*www.dickssupermarket.com*), a grocery-store chain based in Platteville, Wis., which has begun to explore several different technologically enabled alternatives. It has a Web site that sells Wisconsin specialties such as local cheeses for out-of-towners to buy. It offers customized Web shopping lists for "loyalty club" shoppers who buy at least $25 in goods every week and electronic coupons and promotions targeted to those shoppers' buying patterns.

"We're monitoring all sorts of other services — including home delivery," says Kenneth L. Robb, senior vice president of marketing at Brodbeck.

Whole Foods Market Inc.'s Wholefoods.com (*www.purityfoods.com/outsidelinks/wholefoods.html*), an Austin, Texas-based food chain that specializes in natural and organic products, opened its online store last month. Currently, only dried and canned goods delivered to customers via United Parcel Service of America are being offered.

Because it's a vastly more efficient way of doing business — no actual stores to maintain, no expensive staff needed — the Web store offers better prices than traditional outlets, says Carl Morris, president of Wholefoods.com. The goal is to develop a loyal online customer base — shoppers are encouraged to "register" and provide information about themselves — that will enable Whole Foods to develop customized interfaces matching customer preferences and needs. During the next decade, Morris hopes to move a significant percentage of his traditional customers to the online store.

IT Challenges

Though much of the required technology already exists, challenges abound in making that food chain a reality. There are cost issues — the biggest of them involving the distribution of goods. None of the current home-delivery businesses has yet turned a profit.

"Route density — or lack of it — is a major challenge in consumer deliveries," says Larry DeJarnett, managing director of enterprise solutions at A. T. Kearney. "It's all too easy to lose money."

For example, Dick's Supermarkets serves a dispersed rural population in southwestern Wisconsin. It would be difficult to deliver groceries profitably to this spread-out customer base, Robb says. That's why the Peapods and NetGrocers have yet to penetrate his and other rural markets.

But other efficiencies from automating the supply chain could make up for that. For example, a device like the intelligent refrigerator "eliminates a lot of the guesswork of retailing," Robb says. Suddenly the retail grocer has an idea of what the consumer is likely to need a day or two in advance.

Another challenge is installing the necessary network and software. Before the advent of "loyalty programs," there was no way to capture individual buying patterns. Now stores must integrate point-of-sale data from loyalty programs with back-end systems and the data streaming in from online stores.

Currently, says Carlene Thissen, president of Retail Systems Consulting in Naples, Fla., the data derived from online shoppers rarely can be combined with in-store data collected by point-of-sale systems. In-store and online systems are separate and hardly equal. Online stores tend to be much more sophisticated; in-store, cash-register systems are being upgraded so they can be integrated more easily with online and back-end systems.

The ability to combine that information with data from Internet shopping is "the obvious next step," Thissen says.

Shopping Today or Just Buying?

Extending the supply chain to refrigerators will only heat up the competition among supermarkets and online grocers and grocery manufacturers.

Today, the company closest to fulfilling that automatic-replenishment vision is Streamline, a Westwood, Mass.-based Internet grocery business that offers its Don't Run Out (DRO) automatic-replenishment feature based on customer buying patterns. Under DRO, a "standing order" for anything from milk to laundry detergent to razor blades is programmed into a customer profile. The customer can change it at any time; Streamline will monitor usage to make sure the current DRO is correct.

For example, a standing DRO might be to deliver a dozen large eggs every other week; if Streamline notices this need varies, it will e-mail the customer to suggest adjustments. The order is delivered weekly to a refrigerated box in the customer's garage.

Between 40% and 50% of Streamline's subscribers will use DRO on at least one item, says Gregg Kaplan, vice president of operations at Streamline. Why not more items? "It's a matter of control," he says. "People who want total control can always go to the supermarket themselves. At the other end of the control spectrum, you could allow Streamline to decide what to deliver to you every week."

A replenishment model like Streamline's spells opportunity for IT departments at brand-leader companies. It's a chance to "lock consumers into a pattern in which they automatically order your product every week and not even consider others," says Eric Kirby, vice president of the interactive division at Brierly & Associates, a Dallas-based brand-marketing consulting firm.

But with the online retailer's help, "[other] manufacturers can target potential customers more precisely, based on the retailer's knowledge of what they've done in the past," says Tim Harmon, a vice president at IT research firm Meta Group Inc. in Stamford, Conn. A Peapod or Streamline, for example, would possess enough data to know when a certain customer would switch brands to get a better price, he says.

Those who like playing with new technology and don't mind paying a premium could have any number of devices installed at home or have Internet-based services vying for their business within the next 12 months.

"Technically, the idea of automatic replenishment is quite feasible," A. T. Kearney's Craig says. "Precisely how this will play out — from cultural and business perspectives — remains to be seen." ◗

LaPlante is a writer based in Woodside, Calif. Her book, Playing for Profit: How Digital Entertainment is Turning Child's Play into Big Business, *will be published by John Wiley & Sons next month.*

MOREONLINE

For a review of online grocery devices Peapod and NetGrocer [CW, March 29], visit our Web site.
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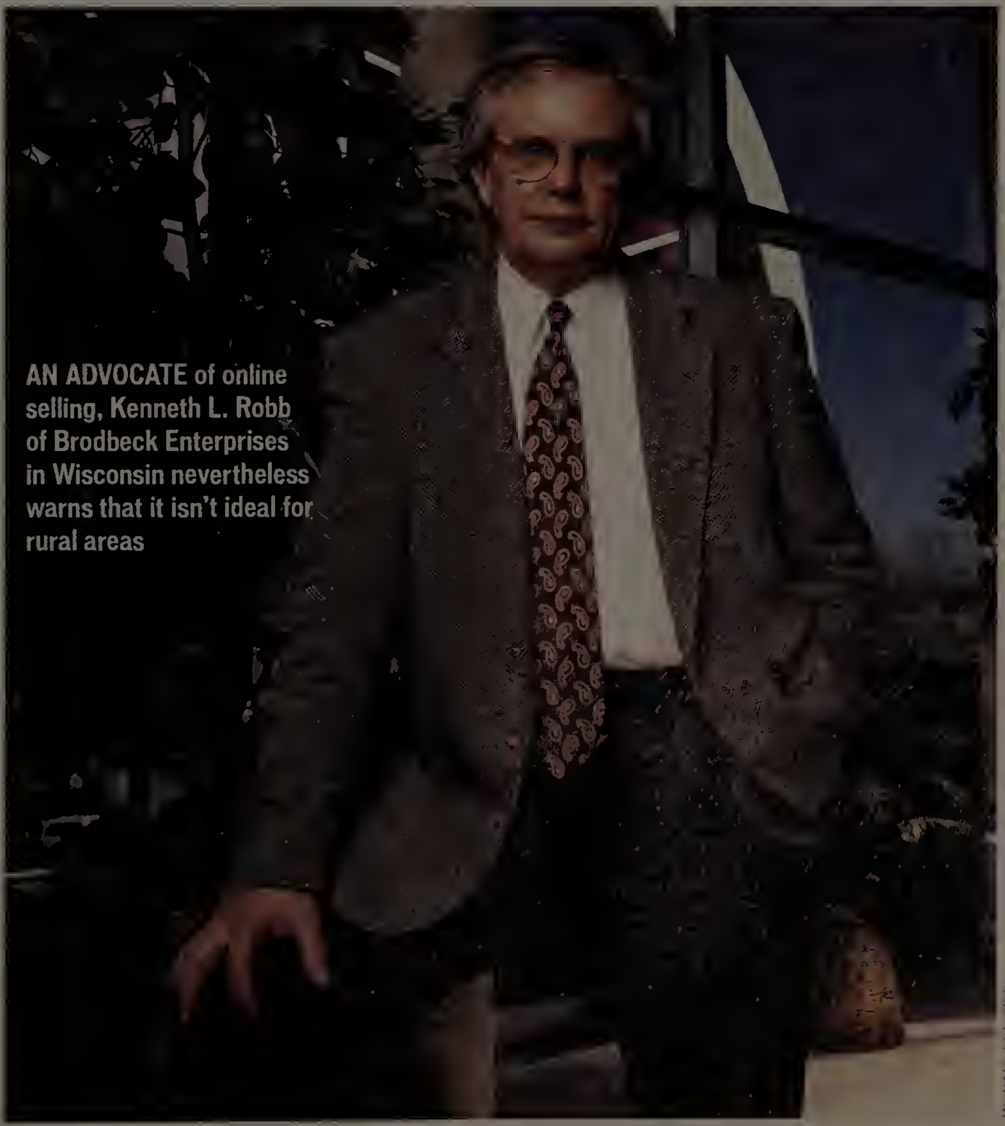


AN ADVOCATE of online selling, Kenneth L. Robb of Brodbeck Enterprises in Wisconsin nevertheless warns that it isn't ideal for rural areas

Bore No More

Technologists can make some of the worst public speakers — but there's no reason IT has to be dull. Here's how to make your speech come alive when it's your turn to give a technical presentation By Rochelle Garner

JOHN FENWICK can captivate an audience. Casting his eye around a room of technologists and businesspeople, he knows how to pitch his voice, use his hands and present a point without causing anyone's eyes to glaze over in a bored stupor.

That's pretty amazing for an engineer discussing Unix, a topic that can send most people on a quick trip to never-never land. But Fenwick, a technical consultant at Hewlett-Packard Co.'s Development Alliances Laboratory, doesn't stand in front of a room to entertain. When he addresses HP's technologists, managers and business partners, he aims to forge a meeting of the minds as they jointly develop next-generation Unix computers.

How did Fenwick become so good at getting his points across? "When I was a young engineer, I had a mentor who realized I wasn't able to reach people," he says. "He told me if I wanted to get ahead, I would have to work on my communication skills so I could stand up in meetings, explain my position and try to build a consensus." Fenwick resolved to beef up his public-speaking skills. That's right, public speaking.

Sure, most technical professionals would rather plunge hot needles into their eyes than be forced to stand up and address a room full of people. And if their presentation becomes one, long drone-athon, audience members may contemplate pulling out their fingernails just to stay awake.

That's when public-speaking techniques can help, say Fenwick and other technical professionals adept at holding an audience. Applying a few effective strategies can make the difference between conveying your message and suffering the sweaty indignities of speaker hell.

Consider the following points:

- **Know your audience.** Don't create a presentation without first knowing who will be listening. Will everyone have a technical background? Then feel free to use some technical jargon. But if only one person comes from a business background, purge your presentation of all acronyms, buzzwords and industry-specific language. "Always prepare for the person with the lowest level of knowledge," says Joanna McWilliams, a Dallas-based principal consultant at Oracle Corp. "Technical presentations become deadly when you use words that distance people from real life."
- **Pick one purpose.** What do you want your presentation to accomplish? Are you trying to explain a position? Influence people? Build a consensus? "Trying to follow too many ideas, especially ideas that tend to veer into the abstract, can be an exercise in futility. That's why every meeting should have one purpose and no more than three major points that support it," Fenwick says.
- **Keep your eyes facing front.** You probably already know how important eye contact is with your audience. What that means in practical terms is "never read to an audience — never. Maintaining eye contact is critical," says Leilani Allen, a partner at Summer Point Consulting in Mundelein, Ill. That's true even for mundane topics like the bottom-line benefits of switching to Linux.
- **Think visually.** Technical people tend to absorb images better than words. That's why it's important to display a picture, graph or cartoon that helps illustrate a point. But don't limit your images to the two-dimensional variety.

Paint word pictures using real-world anecdotes with which the audience can identify. If you're talking about users, bring in real-life user experiences. Ditto for customers. "I think to myself: 'If I were sitting in that chair, what would make a difference in their lives?' " Fenwick says.

STEPHEN SHEFFIELD

> Never read to an audience — never. Maintaining eye contact is critical.
>
> LEILANI ALLEN, SUMMER POINT CONSULTING

And dump the clichés. That means no train, car or sports metaphors.

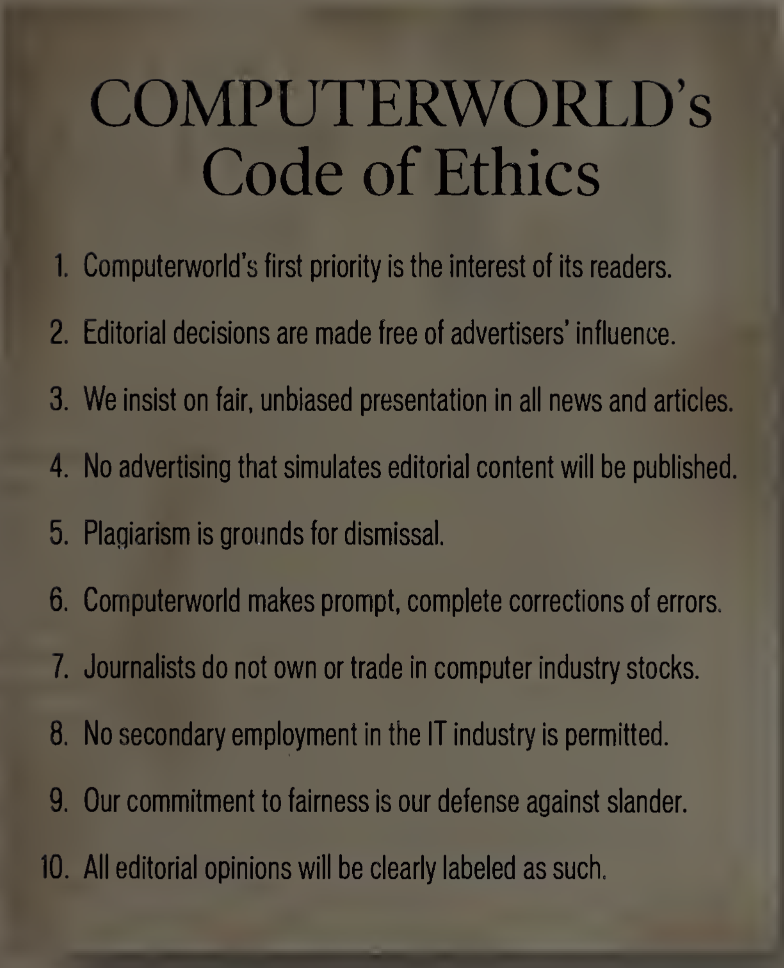
- **Learn the slide rule.** Do you think a slide should be loaded with bullet points and text? Ban that idea. "Good technical presentations have slides with, at most, five bullet points and no more than five words per point," says Terry Daily, controller at Cargill Inc.'s NutraCeutical Department in Minneapolis. "With each point, you want to tell a story or [give] an example. That's what keeps the presentation moving."
- **Keep it short.** You know what's really deadly in a presentation? When the speaker drones on and on and on and ... you get the picture. The solution? Brevity. If you're asked to speak for 30 minutes, Fenwick advises, then limit yourself to 25. Use those last five minutes for questions. But if your presentation absolutely, positively has to last longer, break it into smaller pieces.

"Years ago, I read that the average attention span is 22 minutes," Allen says. "I took that to heart, and structure my presentations in 22-minute chunks." And how do you move between those chunks? Get the audience members involved. Ask how satisfied they are with a particular application or if they've experienced frustrating downtime. Do a quick poll. Or use an anecdote that bridges an old chunk to the next one.

- **Practice, practice, practice.** Few are blessed with the ability to speak naturally and convincingly before a room full of people. That's why it's important to practice. For Allen, that meant memorizing a poem and delivering it in front of a mirror until she got the sing-song out of her voice. Fenwick joined the nonprofit Toastmasters International (*www.toastmasters.org*), local clubs in which people meet in small, nonthreatening groups to rehearse presentations.

The key, though, is to stand up again and again until the words come effortlessly — and your audience becomes convinced. ◗

Garner is a freelance writer in San Carlos, Calif. Contact her at rrgarner@pacbell.net.



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IDG

NOTEBOOK EXTREMES

Hefty or thin, the choice is yours. Key battles in notebook market are happening at opposite ends of spectrum. Page 81

THAT'S THE WAY IT WAS

How technology helped newsman Walter Cronkite predict a landslide in the 1952 presidential election. Page 86

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Y2K MAY STALL WINDOWS 2000

Analysts pessimistic; many expect mid-2000 shipment for Microsoft operating system

BY SHARON GAUDIN

A growing number of analysts are warning users not to expect delivery of Windows 2000 before the middle of next year.

That's at least six months after the delivery date pinpointed last week by Ed Muth, Microsoft Corp.'s group product manager for Windows NT. And the delivery date Muth targeted in his statement — which came on the heels of a confirmed one-month delay in the release of the third beta of the updated operating system — is later than what Microsoft had predicted. In a statement last year, it pegged mid-1999 for the final release of Windows 2000.

Aside from any Microsoft issues, the major culprit behind analysts' prediction of a delay is the year 2000 problem and related system freezes that are expected to go into effect in the second and third quarters at many user companies.

"Based on Microsoft's history and the events coming up this year, like Y2K, I don't see them coming out *Windows 2000, page 16*

JUST THE FACTS

Ripple Effect

Applications that could be affected by a Windows 2000 delay:

- Office 2000
- The BackOffice suite, including updates for
  - SQL Server
  - Exchange Server
  - BackOffice Server

PORTALS LINK BUYERS, SELLERS

Web marketplaces cut costs, speed purchasing

BY CAROL SLIWA AND SHARON MACHLIS

Got cows?

Business users can now buy everything, be it cows, chemicals, electronic parts or paper, through Web portals designed to help them find goods and compare suppliers' prices in specific vertical industries.

Users say this emerging business-to-business purchase process will make transactions faster, simpler and potentially more cost effective.

Take electronics components. Robert Child, director of corporate purchasing at EFTC Corp., an 1,800-employee electronics maker in Denver, said it might take two or three days and 10 or 20 calls just to locate *Portals, page 16*

NEWSPAPER

CHRIS [illegible], a deputy CIO for the city of Indianapolis, says you need to be a tough bargainer and fight for continuous improvement.

NO PANACEA

Farming out the headaches of the help desk to a contractor is a fast-growing trend — and it seems like such a great idea. But as national correspondent Julia King reports, CIOs are learning that a bad outsourcing deal just creates an endless loop of finger-pointing and frustrated users who can't get their technical problems solved. The upshot: Some companies are dumping their outsourcer for poor performance, bringing the help desk back in-house or renegotiating the contract to get service-level agreements.

As one analyst put it, "Broken help desk processes and problems aren't going to be magically fixed by outsourcing." *See page 24.*

HELP DESK OUTSOURCING

COMPAQ NEEDS ENTERPRISE VISION

Hurdles: User retention, product integration

BY JAIKUMAR VIJAYAN AND APRIL JACOBS

It has talked the talk. But can it walk the walk?

One year after stunning the industry with its bid to buy Digital Equipment Corp. and seven months after the deal went through — Compaq Computer Corp. has made great strides in its bid to be perceived as an enterprise player. But that hasn't meant security for the company's enterprise users.

Compaq has promised users that it will make OpenVMS, Alpha and Digital Unix its high-end platforms of choice. But the Wintel-centric company which purchased Digital primarily for its service capabilities — has yet to explain how it plans to do that while integrating its now broad family of technologies into a long-term enterprise strategy. *Compaq, page 103*

COMPAQ CEO Eckhard Pfeiffer could be in trouble, analysts say, if product revenue slows down. Quarterly results are expected this week

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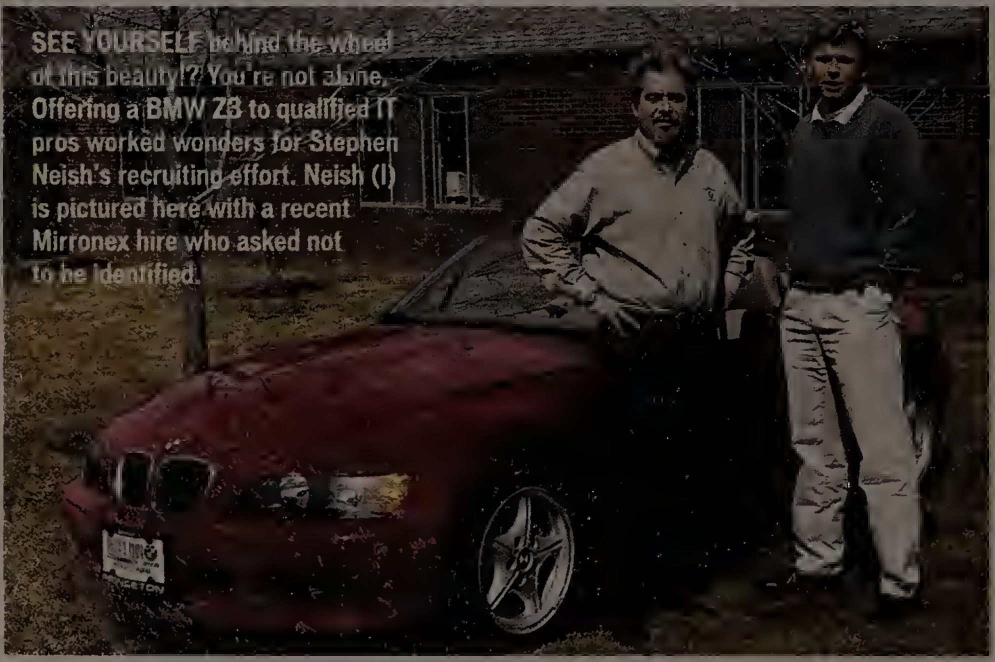
UPPING THE ANTE

Computerworld's
1ST QUARTER
Hiring Survey



SEE YOURSELF behind the wheel of this beauty!? You're not alone. Offering a BMW Z3 to qualified IT pros worked wonders for Stephen Neish's recruiting effort. Neish (l) is pictured here with a recent Mirronex hire who asked not to be identified.

GEORGIO PALMISANO

Staff-starved hiring managers still want lots more talent, which is forcing many to offer unheard-of perks and bonuses By Alice LaPlante

STEPHEN NEISH needed just a few good IT people. Only five, to be exact. But they had to possess some very specific SAP and electronic commerce skills.

He placed ads. He worked with headhunters. He made the usual recruiting rounds. No dice. Not a nibble. Zippo.

Several critical positions on a key project team remained vacant. So Neish, director of strategic business development at Mirronex Technologies Inc., an information technology consulting firm in Skillman, N.J., figured he had to get creative. He decided to give away cars. BMW sports cars.

This highly generous and unusual offer illustrates the lengths to which IT managers like Neish are going to lure those with desperately needed skills and talent. The results of our latest hiring survey reveal that managers will have to be very resourceful in coming weeks, and most have adopted aggressive hiring plans.

To finally land the talent he needed, Neish turned to the Web for help. Through a joint promotion with Hotjobs.com Ltd., the New York-based Web recruiting site, Neish promised BMW Z3 roadsters to qualified candidates who came to Mirronex via Hotjobs.com. The catch: The candidates really had to be qualified, and they had to be offered jobs.

Applications poured in and two superb candidates emerged. A few interviews and a good-faith handshake later, the two duly received their car keys. Now fully staffed for a key electronic commerce project — including three other candidates who were hired through more traditional methods — Neish reflects on his experience for the benefit of other IT managers.

"It's not like we can offer a BMW for every open job," Neish says. "But in this case, we had to do something dramatic. It's hard to get the attention of good people in an IT market that continues to see full employment."

No Laughing Matter

Most IT managers respond like Mike Patrick when asked about their current hiring plans: They laugh.

"It's tough out there," says Patrick, the Carolina-area director for the IT Consulting Services branch of Newton, Mass.-based Renaissance Worldwide Inc., adding that he currently has approximately 100 jobs open.

Patrick urgently needs candidates with comprehensive enterprise networking expertise, candidates who can implement client/server applications with visual front ends and relational database back ends and — especially — senior IT workers who have the know-how to pull it all together to help a company establish a presence on the Web.

"Companies are trying to figure out how they will fit into the Web economy," Patrick says. "All of these areas of IT expertise are needed for them to do that successfully."

Other hiring managers and recruiters tell similar stories. As companies begin emergency ramp-ups of electronic-commerce ventures, their most-wanted lists include IT professionals with combinations of Internet, database management and industry-specific experience.

"Everything centers around e-commerce," says Joe Krafinski, a senior technical recruiter at Datacom Technology Group, an IT recruiting firm in New York. "Companies finally realize that the Web represents a huge new marketplace for their products and services, and that they need to be there."

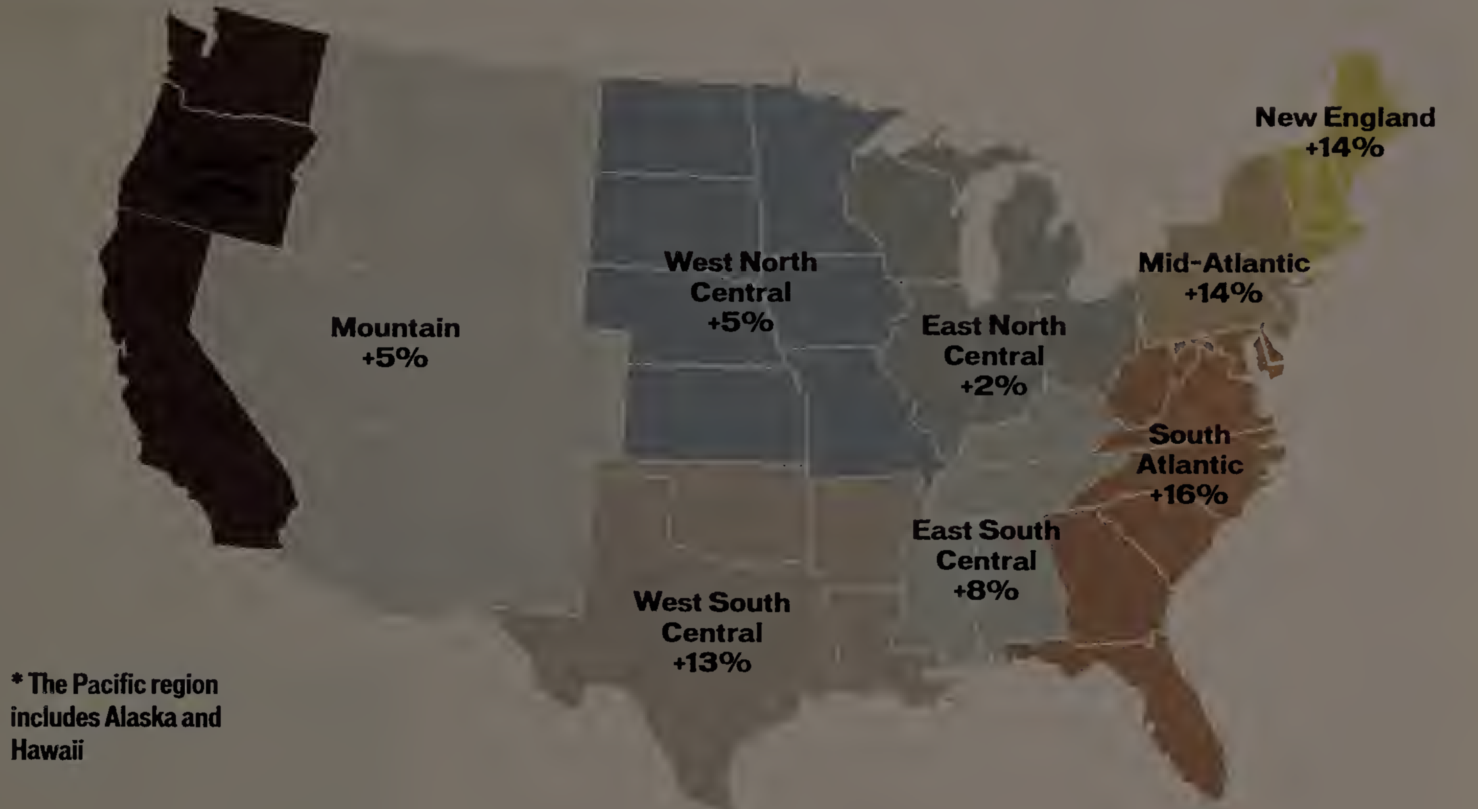
Employees with C++, Java, electronic data interchange (EDI) and data warehousing skills are in demand. "And they're very very hard to find," admits Rachelle Fox, a technical recruiter at Prince, Perelson & Associates, a Salt Lake City IT recruiting firm. And given the importance of electronic-commerce projects, companies are getting more specific about what they need, seeking not just generic knowledge of technologies, but "people with specific platform and — most importantly — specific *industry* expertise," Fox says.

Neish agrees. "We had some very precise needs," he says. For example, he says, it's not that there aren't a lot of people with SAP experience out there, but being part of a large team implementing SAP and having an in-depth understanding of how it relates to industry-specific EDI and Internet development for mission-critical projects is another matter altogether.

"Even so-called expert consultants drop into a firm, do an implementation, smile and walk away," Neish says.

Location, Location, Location

IT hiring projections vary widely depending upon the region in which the company is located. Here are the three-month projections for changes in permanent staff levels :



*** The Pacific region includes Alaska and Hawaii**

"Those types of 'plain vanilla' skills weren't good enough for this project."

Fox has watched as compensation has increased 10% to 20% over the past 12 months for qualified, highly-skilled candidates. "Companies that formerly offered salaries in the $65,000-to-$80,000 range are now offering $75,000 to $95,000, and they are still having trouble filling positions," she says.

Back to Basics

That isn't to say that basic IT skills aren't also valuable in today's market. There's still ample demand for year 2000 programmers (at least for now), those with Windows NT expertise and anyone with basic networking skills.

Just ask Bill Branch, director of the 120-person computer services and telecommunications department at the University of Central Florida. He spent more than two years searching for qualified LAN and WAN specialists.

Handicapped by university rules that set strict degree requirements and salary levels, Branch eventually promoted from within, providing the necessary training to a promising junior staffer.

Branch also managed to convince the university personnel office that something needed to be done if the IT department was going to keep running. Previously, a LAN specialist needed to have five years of experience and a degree — and the pay was just $30,000.

"Obviously, we were shut out of the market," Branch recalls. He was able to restructure that position so that it pays $45,000 and requires just two years of experience. But even that makes it tough to lure qualified candidates.

What Branch has going for him: a more flexible environment than most businesses can offer. This includes flexible hours — "People will take extra time at lunch to play soccer or attend a class," he says. And full-time workers are entitled to six free hours of coursework each semester. It's supposed to be job related, but "we're pretty flexible, as long as they figure out a way to get their work done," Branch says.

Indeed, offering greater workplace (and therefore lifestyle) flexibility is still largely unexplored territory for the majority of firms. But given that it's increasingly difficult to differentiate job offers with the more traditional incentives of higher salaries or promises of stock options, companies are beginning to consider candidates' demands for telecommuting, flexible hours and other alternative working arrangements, Fox says. "Not many firms in our area allow telecommuting — they prefer to have their IT workers on-site," she says. "But since candidates are increasingly asking for it, and since there is often no other way for a company to improve its offer, that might change."

Companies are also finding that job candidates are increasingly interested in the *strategic* goals of the company. "Three years ago, they wanted the particulars of the job itself," Krafinski says. "Now they are delving much deeper into the company's competitive stance. Is it keeping up with what's happening in the market? Is it using technology in a truly innovative way?"

In short, IT workers are thinking like CIOs when evaluating potential employers, Krafinski says. "Previously, you wouldn't have heard programmers asking these kinds of questions," he says.

Which isn't to say that they're in it for the long term. Instant gratification is still pretty much the rule.

"In today's IT world, people don't stay around. They can't be put off by a promise that they'll eventually get [into] something interesting," Fox says.

Employees are especially hungry for vendor accreditation for such hot technologies as Windows NT and NetWare.

Promising to keep employees up-to-date on the latest technologies remains the most attractive lure in today's IT market. But managers and recruiters say candidates want detailed information about what training will be provided — and they want it *now*.

Of course, the additional training makes them even more marketable — and better able to move on to the next job. To counter this catch-22, DRA Software Training has found it necessary to offer its corporate customers "turnover insurance," says Dave Hyatt, vice president at the Tucson, Ariz.-based IT training firm that serves Fortune 1,000 companies. To wit: If a worker trained by DRA leaves within 12 months, DRA will train his replacement for free. "We find this eliminates some of the anxiety for hiring managers — and the anxiety factor in today's IT job market is very high indeed," Hyatt says. ▶

LaPlante is a freelance writer based in Woodside, Calif.

Short-Staffed Now? Just Wait

IT hiring managers reported ambitious hiring plans for the first quarter of 1999, but none revealed where they expect to find qualified candidates. Here's how hiring forecasts break down by industry:

		Permanent Staff Hiring Projections		
INDUSTRY	NO. OF COMPANIES SURVEYED	AVERAGE HEAD COUNT NOW	3-MONTH HIRING PROJECTION	12-MONTH HIRING PROJECTION*
IT consulting	21	49	+15%	+34%
Education	246	20	+11%	+21%
Health care/medicine	133	24	+7%	+15%
Computer sales/peripherals	24	70	+6%	+12%
Wholesale/retail	93	36	+5%	+11%
Business services (non-IT)	65	30	+4%	+14%
Financial services/insurance/real estate	202	78	+4%	+12%
Mining/construction	73	8	4%	12%
Manufacturing (computer)	38	18	+4%	+12%
Communication systems/utilities/transportation	136	91	+3%	+6%
Government (state and local)	125	43	+3%	+5%
Manufacturing (noncomputer)	493	23	+3%	+3%
Government (federal and military)	104	152	+2%	+2%
Total number of companies surveyed	1,750			

* 12-month projections include the three-month projection figures

Dear Career Adviser:

I work as an information security engineer and architect for a Big Five consulting firm in New York. I am planning to apply to another firm and am wondering if I should bypass the recruiter. I can apply via a recruiter they have on retainer or submit my résumé via the company's Web site. If I apply through the recruiter, the company will have to pay a fee. But if I go direct, I can save them recruiting fees, hopefully turning that into a larger salary or signing bonus. Which route should I take? — DO-IT-YOURSELF FRED

Dear Fred:

First, be aware that putting your résumé into a company's database by itself is meaningless, and in this tight employment environment, many companies don't care if they pay fees for the right employees with the right skills.

You'll do better by finding an active, invested person with the right connections to sponsor you — whether he is a paid or an in-house agent.

If you want to do it yourself, find a vice president or other high-level manager and submit your résumé through him. Please heed the words *high level.*

When a vice president takes your résumé and gives it to human resources or the hiring manager and says, "Here's Fred's résumé. He's looking for a job in the ABC group and is especially talented in XYZ technology. He'd be perfect for Jane," this is a great entry. If you're starting from zero, do active research to find this sponsor.

Example: Search the *Computerworld* archives and use tools like BullsEye Pro (*www.intelli-seek.com*) to find all the articles that discuss this company and its senior staff. Find the conferences this company participates in and home in on its speakers. Then call the vice president most likely to understand why you would be a good hire and introduce yourself: "I'm Fred Smith working at Company X. I'm very interested in working for your company because I have a special skill in Technology Y. Do you have a moment to speak with me?"

In other words, let Ms. Senior VP submit your résumé, perhaps earning an employee referral fee for herself, or let her tell you whom to contact. Remember: Recruiting still remains a high-touch process.

Dear Career Adviser:

I have nine years of experience in development, networking and technical support, with two years as a project manager and the rest as a senior programmer/analyst, mostly in client/server development. I have used and worked with DB2, Microsoft SQL Server, Oracle and InterBase. I have also served as a database administrator with small database projects, data modeling and Object Design Analysis. For the best marketability, which language should I stay fluent in: Java, C++ or Cobol? Where should I expect to make the most money, and how much demand is there for systems analysts and project managers? — WHICH WAY TO GO?

FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at **www.computerworld.com/career_adviser.**

Dear Which Way:

Whether systems analyst or project manager, you have mentioned the requisite number of buzzwords to grab a hiring manager's attention, and you are correct: Some of these choices are definitely more exciting than others.

By and large, unless you love Cobol, no matter what you are doing, being able to work in a Web world is key. According to Steve Rubinow, CIO at AdKnowledge, a leading interactive Web marketing company, "The Web is a more specific instance of client/server architecture, and it is both an interesting and rich future environment to work in, particularly if you combine Java, C++ and strong database knowledge, particularly Oracle or, for smaller applications, Microsoft SQL Server."

But mentioning Oracle isn't enough. Can you describe in depth the complexity of what you were doing, your specific role and the length of time you have worked in these technologies? Did you have a database administrator or data architect role? Have you used PL/SQL and the real tools of the industry, such as Designer 2000 and Developer 2000, or did you work merely with a pen and pencil? Although most of the world's databases are in Oracle7 environments, it's Oracle8 that's viewed as leading-edge.

Finally, specify your Unix or Windows NT background. NT is growing, but for the moment anyway, industrial-strength applications that are server-based are still in a Unix world.

Dear Career Adviser:

I am a software consultant with more than six years of IT experience, here on an H-1B visa. I know that my employer is underpaying me because my pay is much lower than the figure he quoted on my H-1B application. What should I do about this?

Also, how can I find another employer who's willing to sponsor an H-1B visa for me at a technology company that's developing its own products? That's where I am most interested in working. — H-1B PETITIONER

Dear Petitioner:

When an employer submits an application to hire someone under an H-1B visa, the employer's first step is to submit a prevailing wage request to the applicable state department of labor. Based on the job description, and experience and educational requirements, the department sets a minimum wage. The employer must pay 95% of that prevailing wage and affirm it will abide by all labor laws.

Employers incur fines and liabilities by misrepresenting their true activities, but if you report your employer, you could be fired. And without a job, your H-1B visa becomes null and void. Your employer must then transport you home unless you find new employment within the 60-day grace period. If you find another employer willing to sponsor you, you could stay.

Unfortunately, there's no centralized database of companies willing to sponsor H-1B visa employees; each company makes that decision on its own. Should you start looking and get fired before you nail that next job, the 60-day rule applies. ▶

WORKSTYLE BRIEFS

Raging Users Crashing PCs

If you've ever been a network administrator or worked a help desk, this may not surprise you, but a recent survey shows that lots of people are pummeling their computers when the $#@%$ things don't work right.

In the online survey – conducted by network analysis and reporting-tool vendor Concord Communications Inc. – 83% of 150 respondents reported witnessing such attacks (see chart). The other 17% hadn't seen any such thing.

The report didn't track the specific causes or results of all those smashed monitors and keyboards, but judging by the amount of communication between users and information technology staffs it took to fix problems, frustration and impatience probably played a part in many destructive moments.

Almost nine in 10 survey respondents said it took more than six e-mail or voice-mail messages between a user and IT to resolve a single problem; more than a third said it took more than 15.

Not all users are stressed-out, of course. As any help-desker will attest, some users are just plain daffy.

The nonviolent, goofy-user stories respondents offered included the following:

- A user, told over the phone to "right-mouse click," thought she was supposed to "write" mouse click and so typed "mouse click" repeatedly on the screen.
- A user refused to get off the phone with the help desk until his problem was solved – even though a tornado was heading straight for his building and terrified colleagues were diving under their desks.
- A user's e-mail wouldn't go through because the user was putting a street address and ZIP code in the "To:" field.

In a Rage

Equipment broken during "computer rage" incidents

Keyboard	19%
Mouse	17%
Monitors	17%
Hard drive (kicked in)	4%
Other	26%

Base: Survey of 150 respondents to an online survey; multiple responses allowed

SOURCE: CONCORD COMMUNICATIONS INC., MARLBORO, MASS.

Perhaps as a result of all this havoc, almost three in four survey respondents confessed to owning a stress ball or stress toy, many of which (46%) had been damaged to the point that they were "deformed with a few wrinkles . . . or some foam falling out," for example. Of course, 43% also said things like, "I had a stress toy, but I threw it in frustration, and now I don't know where it is."

So users aren't the only ones taking their frustrations out on inanimate objects.

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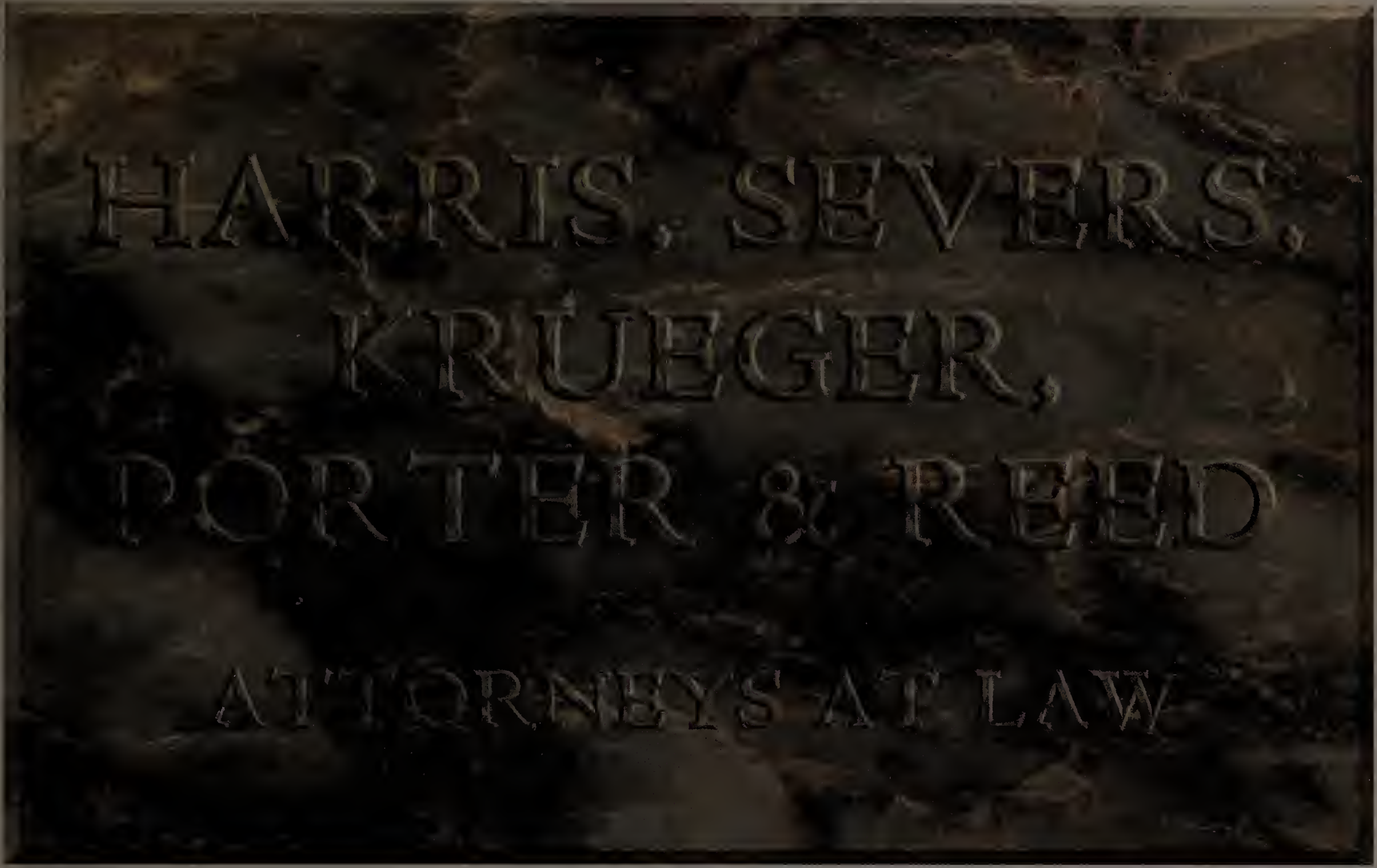

You'll be hearing from them on January 3, 2000.

If your Y2K remediation is complete, congratulations are in order. But there are still questions, especially in case of a lawsuit: has the work been independently verified? Can you prove due diligence? Have you made contingency plans for Y2K emergencies? Have you got business continuity plans in place? ADPAC has the tools and the training to make the answer to all those questions "yes".

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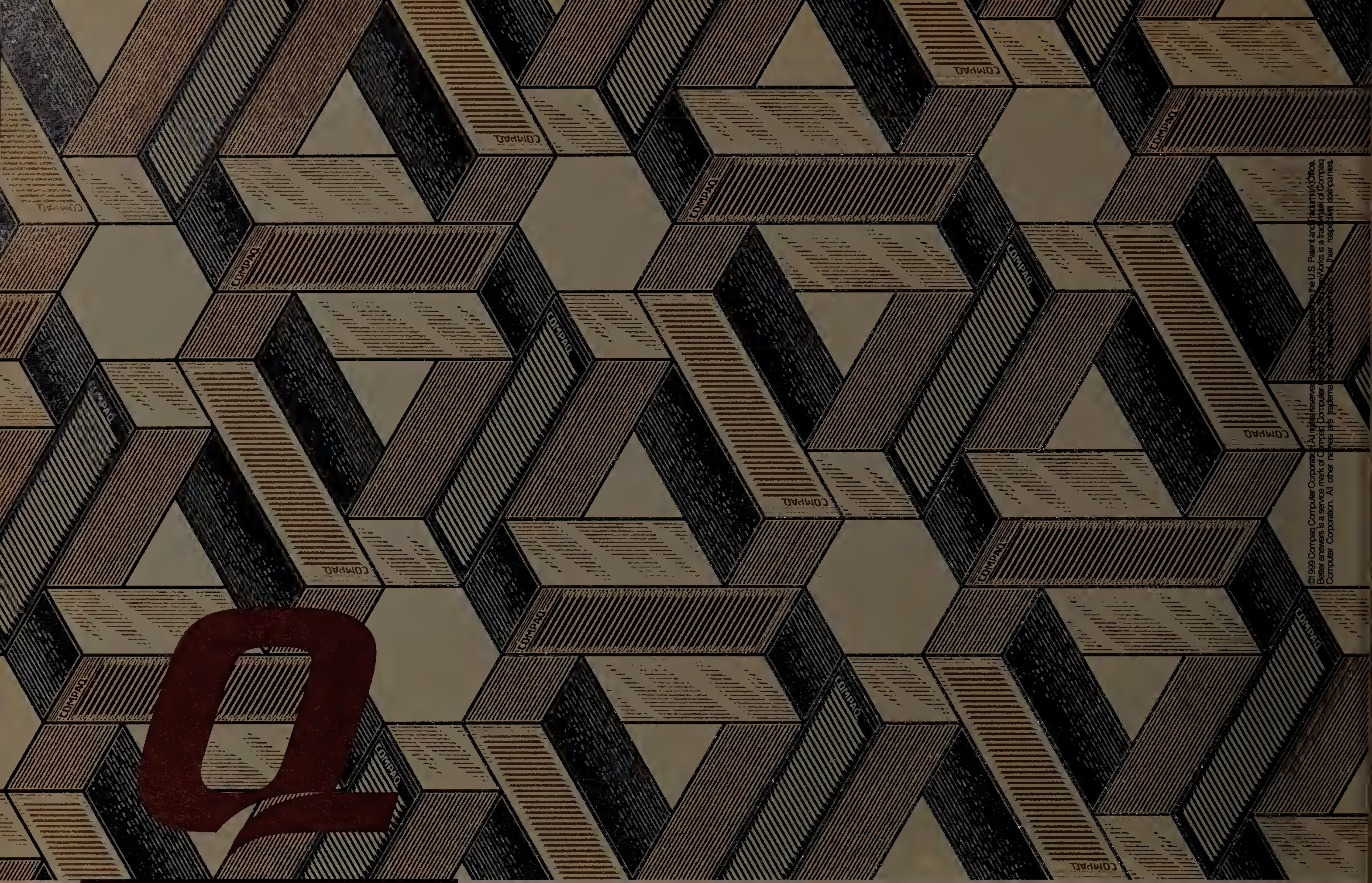

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TECHNOLOGY

JUST ENOUGH DATA TRANSFER

Most application-integration hype centers on software for building real-time links between systems. But some users are getting by with less-expensive data conversion tools that support more-occasional batch-file transfers. ▸ **62**

GIGABIT ETHERNET ON COPPER?

An IEEE standard expected in September would let IT bring Gigabit Ethernet wherever it's needed over existing copper wiring — instead of installing more-expensive fiber-optic cable. ▸ **66**

DEVELOPER SITES

Demand for more and better technical information is driving vendors to overhaul their developer Web sites into well-organized, one-stop answer shops. But so far, reviews are mixed for sites from Microsoft, Sybase and Inprise. ▸ **62**

FRANKLY SPEAKING

Melissa affected hundreds of thousands, maybe even millions, of corporate users. Maybe, IT will stop treating macro viruses as kid stuff and learn a lesson, Frank Hayes writes. ▸ **69**

CLUSTER BUSTER

Hardware vendors are offering customers many additional remedies for what observers say is the biggest challenge to clustering Windows NT servers: Manageability. Meanwhile, E. W. Scripps Co. has moved its 700 Web sites from a Digital cluster to Sun servers with cluster software from storage vendor Veritas as part of a drive to provide 24-by-7 uptime. ▸ **64**

HACK OF THE MONTH

Make sure your antivirus software is up to date to avoid the 1.2 version of the CIH virus, which can erase the hard drive and BIOS of an infected machine. ▸ **66**

QUICKSTUDY: SPAM

Users are losing bandwidth, storage and time because of spam. It's so bad, the government is stepping in to help curb the problem. ▸ **70**

FIELD REPORT: THE TOP 100

A panel of experts and *Computerworld* readers identify the 20th century's 100 most significant IT products and innovations. ▸ **74**

Y2K TOOL TIME

We tried out three Y2K desktop products: McAfee 2000 Toolbox, Norton 2000 and Detect 2000. ▸ **68**

MORE

Exec Tech 68
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KATHERINE LAMBERT

NSF DIRECTOR RITA R. COLWELL:
"It's not just an initiative, it's an imperative"

SHORING UP IT RESEARCH

A BLUE-RIBBON PANEL last month called government spending on IT research "seriously inadequate." A White House initiative is seeking $366 million in additional federal research funds next year in a program to be led by the National Science Foundation. We asked NSF Director Rita R. Colwell why your tax dollars should fund IT research and if Congress will OK the money.

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BATCH INTEGRATION TOOLS CUT COSTS

More vendors unveil tools to link ERP systems with homegrown applications

BY CRAIG STEDMAN

MOST OF THE application integration hype centers on high-priced software for building real-time links between systems. But some users are getting by with cheaper tools that support occasional data transfers.

And the availability of those batch integration tools is increasing as vendors take packages focused on one-time data conversions and modify them to handle ongoing interfaces between homegrown applications and enterprise resource planning (ERP) systems.

For example, Emeryville, Calif.-based Convoy Corp. last week released software that supports batch interfaces to PeopleSoft Inc.'s ERP software. Cross Access Corp., in Santa Clara, Calif., this week plans to announce the same thing for SAP AG's R/3 suite, extending a tool it shipped in December for Oracle Corp.'s applications.

Not everyone can utilize those tools, users and analysts said. They're best-suited for passing along personnel records and other data that can be updated daily, weekly or even monthly, not for processing orders and other business transactions (see box).

But if batch updates are all you need, the data conversion packages can be less expensive and easier to use than tools that support real-time interfaces, said Dick Ho, senior vice president of personnel technology at MBNA America Bank NA, a credit-card company in Wilmington, Del., and subsidiary of The MBNA Corp.

MBNA America Bank used Convoy's tool to build about 20 interfaces that tie PeopleSoft's human resources software to its homegrown financial systems and outsourced payroll and 401(k) applications.

Power users in the human resources department were able to map the interfaces that specify which data has to be transferred between source and target databases, Ho said. That let MBNA limit its use of hired-gun technical consultants to tuning the performance of the interfaces after they are generated.

And Convoy's tool cost only $80,000, which Ho paid from his own budget. Real-time integration software "would require a decision higher above me, and that could drag this thing on forever," he said.

Real-time tools from vendors like CrossWorlds Software Inc. and Software Technologies Corp. can cost $1 million or more with consulting added in, said Dan Sholler, an analyst at Meta Group Inc. in Stamford, Conn.

But it's hard to get that kind of investment approved, Sholler said. On the other hand, a data conversion tool "can be something that flies under the radar and delivers at least some of the benefits" of integration, he added.

Similar Workings

Other vendors with such tools include Palo Alto, Calif.-based SmartDB Corp., which shipped software for Oracle's applications last summer and added PeopleSoft support in February. TSI International Software Inc. in Wilton, Conn., just added a PeopleSoft version of its Mercator tool, which already supports R/3.

Mercator handles both real-time and batch interfaces. Texas Instruments Inc.'s semiconductor division is using the tool to build a mixed set of links tying R/3 to mainframe-based manufacturing and corporate finance applications.

Installing a messaging system based on IBM's MQSeries middleware was also a complication on the real-time side, said Chris Fowler, a systems analyst at Texas Instruments in Dallas. The technology needed to do batch data transfers "was pretty much already in place," he said. ▶

Pull Yourself Together

Application integration tools that support occasional data updates are best suited to users who:

- **NEED TO TIE ERP** software to mainframe applications and other homegrown systems that aren't being replaced
- **ARE MOVING BATCH**-oriented data, not time-sensitive business transactions such as new orders
- **CAN'T AFFORD TO** spend the $1M and up that real-time integration projects can cost
- **WANT TO MINIMIZE** their reliance on integration consultants who charge up to $150 per hour

Standards Council

Conceding that real-time application integration tools are immature and require lots of consulting help, a group of 20 vendors last week said they're banding together to set standards for the technology.

The new Enterprise Integration Council plans to specify a common architecture for integrating applications, adopt a uniform set of technical terms and create a reference model that prospective customers could use to gauge the software's potential business value.

The first pieces of that should be ready by June, said David McGoveran, a consultant in Boulder Creek, Calif., and the council's chairman. The group is also open to users and systems integrators, he added.

Justifying the big-ticket prices of packaged integration tools isn't easy for users now because vendors can't point them to many working installations, said Scott Lundstrom, an analyst at AMR Research Inc. in Boston.

Whether the council can help is unclear, Lundstrom said. With such groups, "you tend to get into tactical bickering over what compromise leaves who in a better position than everyone else. Vendors will be vendors." – *Craig Stedman*

Developer Sites Not Fully Developed – Yet

Vendors out to improve usefulness of sites

BY DAVID ORENSTEIN

Demand for more and better technical information is driving vendors of development tools to overhaul their developer Web sites into well-organized, one-stop answer shops akin to portals.

To try to deliver on that promise, Microsoft Corp. is currently rolling out a new developer site (*msdn.microsoft.com/defaultbeta.asp*) as a public beta; Emeryville, Calif.-based Sybase Inc. beefed up its developer site (*sdn.sybase.com/sdn/index.stm*) in mid-March; and Scotts Valley-based Inprise Corp. has been betting half its business on its newly formed Borland.com division (*www.borland.com*) since early February.

Survey Shows Importance

Most developers consider a good vendor Web site as the most valuable part of that vendor's developer community, according to a January survey by Evans Marketing Services Inc. in Santa Cruz, Calif.

Of 348 developers surveyed, 55% ranked the Web site most important; 19.8% most valued a dedicated Usenet group; and 17.2% said they valued a priority phone support line.

As it merges its Site Builder Network and the Microsoft Developer Network into one new site, Microsoft is improving its search engine and adding newsgroups and guest columnists.

But Patrick Schmid, a software engineer at Bently Nevada Corp. in Minden, Nev., whose systems monitor and protect rotating machinery, said he couldn't find critical information at the site.

Schmid's recent search didn't turn up documentation of the registry changes he must execute to configure security settings on Microsoft's Internet Information Server running on Windows NT Server 4.0.

He said he's skeptical about the results of Microsoft's beta. "I'm from Missouri," Schmid said, "and they have to show me."

Gerald Benusa, a systems programmer at The Bankers Bank in Atlanta, said he found Borland.com to be better than Inprise's old site.

The old site buried nuts-and-bolts technical support under a heap of information about enterprise products such as middleware, but not necessarily tools, Benusa said.

On the new site, he said, newsgroups where he can find tool-specific advice about client/server development are linked from the home page.

Larry Perlstein, an analyst at Gartner Group Inc.'s Dataquest unit said the timing of the site overhauls is coincidental — all of them cried out for improvement. "They all needed a facelift," he said. ▶

SYBASE
application developers
mobile&embedded developers
SDN
Sybase Developer Network
about SDN
member login
Document Done

SYBASE, AMONG OTHERS, has beefed up its development site to ease access to information

BRIEFS

Hyperion OLAP Server Upgrade

Hyperion Solutions Corp. has announced a new version of its online analytical processing (OLAP) server: Hyperion Essbase 5.0.2. According to the Sunnyvale, Calif., company, the server supports multiuser read/write access and can simultaneously load, calculate and query partitioned OLAP applications in parallel. Support for both Unix and Windows is available.

Pricing begins at $995.

www.hyperion.com

Spam Blocker For Windows NT

New antispam mail server software for Windows NT is now available from Rockliffe Systems Inc. Rockliffe MailSite 3.0 provides Web, Java and Windows management consoles. It includes third-party filter libraries, the Santa Clara, Calif.-based company said. Secure password authentication and Lightweight Directory Access Protocol 3 compatibility are included.

Pricing starts at $495 for 100 users.

www.rockliffe.com

Psipenta ERP Suite

Psipenta USA Inc. has announced Psipenta 4.0, enterprise resource planning software for midsize manufacturers of equipment. The object-oriented application suite includes a management database that tracks different points in the product life cycle, according to the Westwood, Mass., company. Client components are Windows-based; servers run on Windows or Unix.

Pricing starts at $175,000.

www.psipenta.com

Nontechie Web Tool

Columbus, Ohio-based WebROI Ltd. has announced SiteDriver 1.5, Website content management software for nontechnical professionals. The tool lets any user with a Web browser or a Lotus Notes client compose and post content to Web sites, intranets and extranets, the vendor said.

The software costs $30,000.

www.webroi.com

LeoLogic Data Management Package

LeoLogic Inc. has released Genio 3.0, a data extraction, transformation and transportation tool for data movement between disparate data stores. The engine-based tool works with source and target databases and extracts, transforms and loads information bidirectionally, according to the Andover, Mass., company. It has a graphical user interface and is database-independent.

Users can select any relational database management system to store the Genio repository. A Windows NT version is shipping now; Unix versions are scheduled to be available this month

Pricing ranges from $80,000 to $150,000.

www.leologic.com

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Computerworld
Investor's Business Daily

BRIEFS

Dell Ships a Celeron PC . . .

Dell Computer Corp. is shipping a Dimension V desktop PC that incorporates a 433-MHz Celeron processor from Intel Corp. The new PC includes 32M bytes of synchronous dynamic RAM, a 6.4G-byte hard drive, a 15-in. monitor, a 32-speed CD-ROM drive and an 8M-byte graphics card. It includes Windows 98, Microsoft Office 97 Small Business Edition 2.0 and virus-protection software.

Pricing starts at $1,299.

www.dell.com

. . . As Does Compaq

Compaq Computer Corp. is now shipping a Deskpro EN Series desktop PC with a 400-MHz Celeron processor from Intel. The new system includes 32M bytes of RAM and a 15-in. color monitor. It ships with Windows 95.

The Deskpro EN Series costs $1,249.

www.compaq.com

Upgrade Kit For HP Palmtop

Hewlett-Packard Co. has announced an upgrade kit for its HP 620LX color palmtop PC. The kit will double the palmtop's RAM from 16M bytes to 32M bytes. It will include an upgrade from Windows CE 2.0 to Windows CE Handheld Professional Edition. The kit will be available in June, HP said.

The kit costs $179.

www.hp.com

MiTAC Offers Tough Display

A 15-in. flat-panel display designed for rugged, high-traffic environments is now available from MiTAC Industrial Corp. The MIM-115A has a sealed aluminum alloy casing that's waterproof and dust-proof, according to the Fremont, Calif., manufacturer. It supports resolutions up to 1,024 by 768 pixels, offers touch-screen functionality and can withstand shock forces up to 10 times the force of gravity.

The MIM-115A costs $2,765.

www.mitacinds.com

VENDORS, USERS PUSH FOR CLUSTER SOLUTIONS

Dell, HP, others offer management tools aimed at easing NT Server clustering

BY STACY COLLETT

Hardware vendors are offering customers a slew of additional remedies for what observers said is the biggest challenge to clustering Microsoft's Corp.'s Windows NT servers: manageability.

"The biggest challenge from an IS perspective is managing multiple systems. What is most desirable is to get a single system view," said Joe Clabby, an analyst at Aberdeen Group Inc. in Boston.

Dell Computer Corp. announced last month it will add NuView Inc.'s ClusterX software to clustered computers running Windows NT.

Observers said the software, which will improve the installation, configuration, monitoring and management of NT-based network servers, will give clustering a boost. "Microsoft Cluster Server has a number of inadequacies," said Harvey Hindin, an analyst at D. H. Brown Associates Inc. in Port Chester, N.Y. "ClusterX allows system administrators to manage NT clusters far better."

Similar Offerings

Data General Corp. announced a similar agreement with Houston-based NuView earlier this month. And Compaq Computer Corp. this quarter is expected to ship Insight Manager XE Cluster Monitor and Cluster Insight Manager, Web-based software that allows administrators to monitor cluster performance, errors and failures.

However, analysts said high-end clustering will remain a weak point for Windows NT at least until the release of Windows 2000, which isn't expected before the end of the year [CW, Jan. 25].

Although ClusterX will be available as an add-on by year's end, potential users are remaining cautious, vendors said.

"If it came out at the end of the year, we would probably still wait another quarter to see what bugs flop out of the system," said Dale Barnett, a distributed database systems specialist at the Florida Department of Transportation in Tallahassee, Fla.

JUST THE FACTS

NT Clustering Headaches

Problem: How to manage multiple systems in a cluster

Remedy: Create a single system view

Possible solutions: Dell, Data General add NuView ClusterX software; Hewlett-Packard adds Giganet Cluster LAN products

The agency runs nine Microsoft Wolfpack clusters on Dell 6300 PowerEdge servers. Each server has fewer than 200 concurrent users. But an electronic-document management system serving 2,000 users will roll out on the servers later this year. It may require a four- or eight-node cluster.

On the connectivity front, Hewlett-Packard Co. said it will include Giganet Inc.'s Cluster LAN products on HP NetServers. Giganet's Cluster LAN will increase performance to support high-availability applications such as server mirroring and high-speed backup, according to HP officials. Cluster LAN will be included on the HP NetServer Tested Products list by midyear.

IBM is set to release a new switch — which will provide a high-speed interconnect — in this year's second quarter. The switch will initially support eight nodes, according to an IBM spokesman.

The company's Cornhusker software, which builds on Microsoft's Cluster Server, will initially offer eight nodes. It will also be available in this year's second quarter. ▶

Scripps shifts to Sun Web servers in quest for 24/7 uptime, faster fail-over recovery

BY NANCY DILLON

Steven Hicks runs the 700 Web sites under his control the same way his $1 billion media company operates its television broadcasts. "They simply can't go off the air," said Hicks, chief technology officer at E. W. Scripps Co.'s Web-hosting facility in Knoxville, Tenn. "If we're talking about sites for our local news [units], they may be the only sites providing local news for an area."

Scripps' Web sites for newspapers, broadcast stations and advertisers serve up to 80 million page views per month.

To help achieve around-the-clock uptime, Scripps has turned to Web server clustering. Until last August, the company used TruCluster Available Server software from Digital Equipment Corp. on Digital's servers. The Web sites were then moved to two E3500 servers from Sun Microsystems Inc. to run file system, volume management and node fail-over software from Veritas Software Corp. in Mountain View, Calif.

"The biggest problem with the [Digital] setup was that pretty much all Web applications are first developed on Sun," said Bryan Allen, director of Web services at Scripps. "We found ourselves waiting for things [such as advertising applications and audio/video streaming] to be ported to [Digital], and that hurt development efforts."

With Scripps' Sun cluster, the two servers are connected via a fiber link and share a Sun A5000 Fibre Channel disk array. The fail-over software, called FirstWatch, provides monitoring and restarting of software for the Web sites. It triggers node fail-over in the event of problems with hardware, the Domain Name System or databases supporting the sites.

Planning to Upgrade

Allen's group plans to upgrade to Veritas' new cluster offering, ClusterServer, in the next few months. ClusterServer can support up to 32 nodes; FirstWatch couldn't go beyond four. In addition, "With FirstWatch, fail-over is an all-or-nothing decision," Allen said. But with ClusterServer, "If we have just one site in a group of five fail, we could just fail over the five sites," he added.

During a fail-over, ClusterServer can bring up interfaces and Web servers in parallel, as opposed to FirstWatch's sequential approach. That difference should cut hardware fail-over time from the current 12 minutes to less than one minute, Allen predicted.

E. W. SCRIPPS' STEVEN HICKS says because the company's 700 media Web sites "simply can't go off the air," Web server clustering is used to ensure around-the-clock uptime

In the data center of the future, all servers will exist in some type of cluster, said David Floyer, an analyst at ITcentrix in Mountain View, Calif. He said the leading cluster vendors today are IBM and Digital, but their clustering is proprietary to hardware such as mainframes and AS/400s.

Companies like Veritas, he said, are offering clustering for Unix and Windows NT as more critical applications are run on them. Other companies that offer hardware-independent clustering software include Vinca Corp. in Orem, Utah, and FullTime Software Inc. in San Mateo, Calif. FullTime released Version 4.2 of its cluster product last week. ▶

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STANDARD EYED FOR GIGABIT ETHERNET OVER TWISTED-PAIR

Users would save by using existing wiring instead of pricey fiber installation

BY BOB WALLACE

THE INSTITUTE of Electrical and Electronic Engineers (IEEE) is expected to approve a standard this fall that will let companies support Gigabit Ethernet over twisted-pair wire, preventing the need to install more expensive fiber-optic cable.

The proposed standard has widespread support and could yield compliant products by year's end.

If it passes, companies with Category 5 twisted-pair wiring throughout will be able to support Gigabit Ethernet wherever needed at distances up to 100 meters.

The draft standard, which creators and backers expect to be approved at the IEEE's September meeting, specifies use of four pairs of Category 5 twisted-pair wire, which is the most widely installed building wiring.

Approval by the IEEE — the group that has developed most LAN standards — is widely seen as iron-clad.

Many Uses

Gigabit Ethernet over twisted-pair will be used first in backbone networks and may eventually support workstations that run super-high-bandwidth applications.

"The primary application will be to link high-performance servers to switches . . . anywhere you need Gigabit throughput to a server," said Esmerelda Silva, an analyst at International Data Corp. in Framingham, Mass.

If connection distances are less than 100 meters, "why would you pay to have fiber installed?" Silva asked.

STELLA JOHNSON

IHA CIO JIM BARRY says a twisted-pair standard could save his company money through reuse of its existing network

The standard "would allow us to reuse our existing infrastructure as opposed to replacing it," said Jim Barry, CIO at Insurance Holdings of America Inc. (IHA) in Beverly, Mass.

He estimated that a 200-ft. run of twisted-pair wire costs $80, while the equivalent length of single-mode fiber costs $200.

Though IHA already has a Gigabit Ethernet fiber backbone supporting dozens of servers, rapid growth and a lack of room has forced Barry to locate groups of servers in empty conference rooms that are served by Category 5 cable. The twisted-pair alternative could eventually save IHA money while extending Gigabit Ethernet to the devices.

Products Promised

3Com Corp., Nortel Networks and Cabletron Systems Inc. have pledged to develop networking products that support Gigabit Ethernet over Category 5 twisted-pair but wouldn't divulge details.

Cisco Systems Inc. said it will support the medium when customer demand warrants it.

Experts said they expect the networking products to include new switches, auto-sensing server adapter cards, uplink modules and blades that would enable existing switches to support Gigabit Ethernet and other technologies simultaneously.

Colin Mick, principal at The Mick Group in Palo Alto, Calif., and a member of the IEEE group that developed the standard, said that although 90% of Category 5 twisted-pair wire can handle Gigabit Ethernet, users should either test the wire themselves or hire a third party to determine if it can handle the signal without interference or echoes.

"This may not be a big deal, but we're advising it to be conservative," Mick said. ◗

MOREONLINE

For more information on Gigabit Ethernet and network wiring, visit our Web site.
www.computerworld.com/more

'CIH' Virus Dangerous, But Easy to Avoid

Hard drive, BIOS are vulnerable without latest antivirus updates

First in an occasional series on corporate security breaches.

BY DEBORAH RADCLIFF

Late last year, network administrators at Lockheed Martin Corp. were hammered with calls from users in an 8,000-node subnetwork.

HACK OF THE MONTH

The users couldn't access some of their files. When administrators examined the damaged files, they found the letters "CIH" in ASCII code at the end of them. "That's when technicians suspected that we had a virus. When the virus started replicating, they sent it to us to find out why it hadn't been caught," said Padgett Peterson, Lockheed's chief architect of corporate information security.

After CIH was reported last summer, Peterson's staff had upgraded its antivirus software to protect against it. But the fast-spreading, nearly undetectable strain that hit Lockheed was actually an older version — CIH Version 1.2 — of the 1.4 version reported last summer. Most systems have been cleansed of Version 1.4, which attacks on the 26th day of each month.

Version 1.2 is a once-a-year deal — and it's set to go off April 26. With it goes the hard drive and possibly the BIOS of every machine infected. Loss of the BIOS renders the machine unbootable.

By the time Lockheed technicians diagnosed a CIH Version 1.2 infection, approximately 35 machines had fallen ill. But it could have been much worse — especially if it had gone undetected through April.

CIH infects Win 32 executables (such as program files and directories) in Windows 95, 98 and NT, according to Roger Thompson, technical director of malicious code research at the International Computer Security Association Inc. (ICSA) in Carlisle, Pa.

There are conflicting views on the potential dangers, but the ICSA deemed it noteworthy enough to publish a rare press release warning of the virus on March 10. "We've probably had a hundred reports from vendors" about the virus since, Thompson said.

Still, Thompson conceded that the monthly version never lived up to its original threat because it never spread widely. Version 1.2 is more widespread and doesn't betray its presence.

Others suggested damage will be minimal, because a 1999 version of any popular antivirus software will protect against the virus. According to the ICSA's 1998 Virus Prevalence Survey of 300 respondents, 91% said they had antivirus software installed on 91% of 12,122 servers and on 98% of 581,458 desktops.

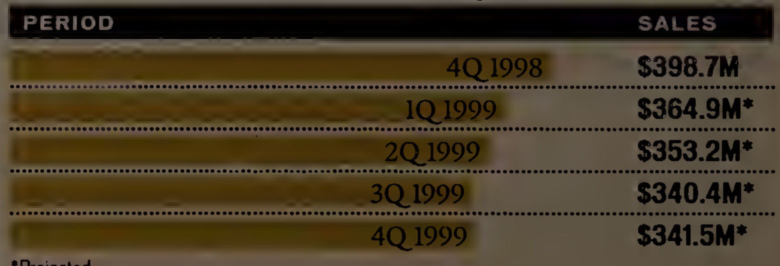
But countries such as Thailand, India and Indonesia and continental Eastern Europe may have problems, said Chengi Kuo, director of antivirus research at Network Associates Inc. in Menlo Park, Calif. Smaller shops with few information technology resources could also be vulnerable if they haven't upgraded their antivirus software. Satellite offices, laptops and home computers are also at risk, Thompson added.

Anyone who hasn't already updated his antivirus software should do so now. A list of vendors that protect against CIH V 1.2 can be found at the ICSA Web site *(www.icsa.net/virus/cih_bulletin.shtml)*. ◗

Radcliff (DeRad@aol.com) is a freelance writer in Northern California.

SNAPSHOT

Ethernet Hub Sales to Slip Worldwide



PERIOD	SALES
4Q 1998	$398.7M
1Q 1999	$364.9M*
2Q 1999	$353.2M*
3Q 1999	$340.4M*
4Q 1999	$341.5M*

*Projected

SOURCE: DELL'ORO GROUP, PORTOLA VALLEY, CALIF.

BRIEFS

Matching Users, Dynamic IP Addresses

Check Point Software Technologies Inc. has introduced technology that can match a user's identity to a dynamically assigned IP address. Called User-to-Address Mapping, the technology allows administrators to implement policy-based management at the user level, even in Dynamic Host Control Protocol environments, according to the Redwood City, Calif., company. The technology is now in Check Point's Meta IP software.

Meta IP 4.1 Enterprise Edition pricing starts at $9,995 with 1,000 nodes.

www.checkpoint.com

Efficient Networks Adds ADSL Modem

A new, Universal Serial Bus-compatible Asymmetrical Digital Subscriber Line modem is now available from Efficient Networks Inc. The SpeedStream 4060 offers dedicated access at rates up to 8M bit/sec. downstream over standard copper telephone lines, according to the Dallas company. The external modem incorporates Windows' Dial-Up Networking capability.

The modem costs $299.

www.efficient.com

PictureTel Offers ISDN Gateway

PictureTel Corp. has announced the PictureTel 240, a gateway that connects Integrated Services Digital Networks (ISDN) videoconferencing systems with IP systems. The gateway links standards-based videoconferencing systems that support the H.320 standard for ISDN and the H.323 standard for IP, according to the Andover, Mass., company.

Pricing starts at $19,995.

www.picturetel.com

Faster Switches

Allied Telesyn International has announced the AT-FS709FC and the AT-FS716, eight-port and 16-port Fast Ethernet switches. The AT-FS709FC offers eight 10/100M bit/sec. connections and carries one fixed-fiber uplink for connection to a server or fiber backbone. The AT-FS716 can stand alone to service 16 connections or stack for larger networks, according to the Sunnyvale, Calif., company.

www.alliedtelesyn.com

Data Fellows Adds Antivirus Suite

Data Fellows Inc. has announced F-Secure Workstation Suite 4.0, software combining antivirus protection with file and network encryption. The Windows 95/98/NT security suite integrates real-time encryption directly into the Windows file system. That ensures files are never stored in a readable form, according to the San Jose, Calif., company. The product offers centralized management and integrates with Microsoft Corp.'s Systems Management Server.

Pricing starts at $99 per seat for a 100-user license.

www.datafellows.com

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Y2K Tools Scrub Desktop

BY JAMES M. CONNOLLY

"GOOD AFTERNOON, this is the help desk."

"Hi. I know it's Christmas Eve and everything, but, um, I have this PC at home and I tried one of those Y2K fix-it programs. And, um, I think it found a bunch of problems, but I don't know what to do now."

Every help desk will be getting calls like that as 1999 winds down. I tried a few of the programs designed to bring PCs and their applications into compliance with year 2000, looking at them from the point of view of a typical user.

The good news is that the packages are relatively easy to use, and with an investment of just a few hours and $30 to $50 you can get a sense of assurance about your PC's year 2000-readiness.

For example, you might see what types of problems are spotted, which are most significant and which could crash your system. In my case, the only severe problems were in obscure templates in Microsoft Corp.'s Access or in seldom-used applications.

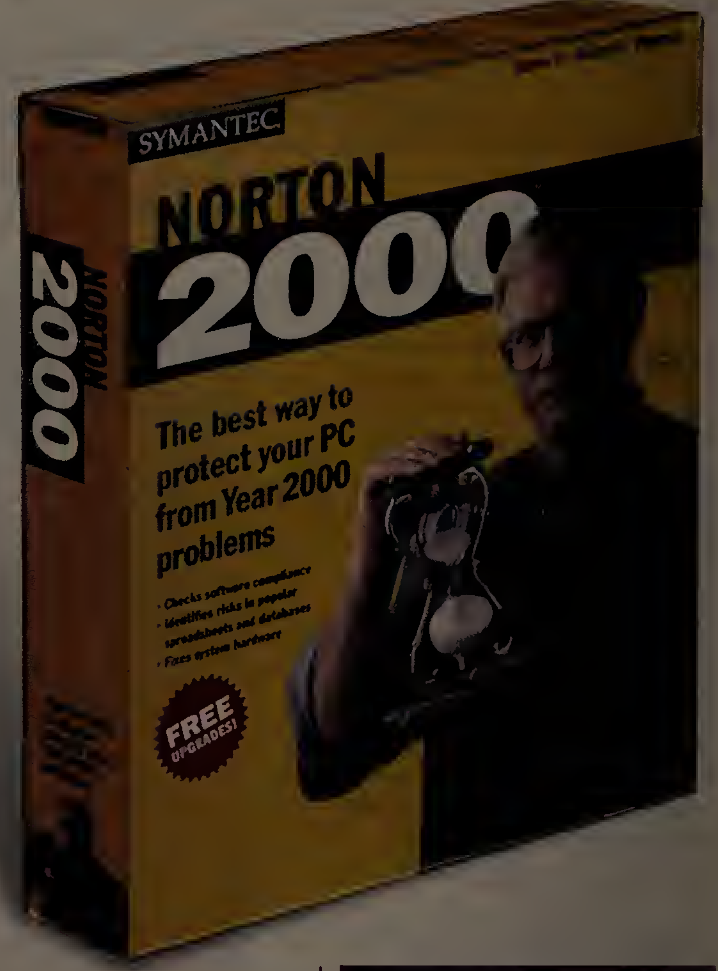
On the downside, I was left wondering about the six to 20 programs on each of my systems that each test package didn't recognize, and whether the tools really did catch all of the problems. "You trust them like you do the government: You don't have a lot of options. But my gut instinct is that they're fairly trustworthy," says analyst Norbert Kriebel at Giga Information Group Inc. in Cambridge, Mass.

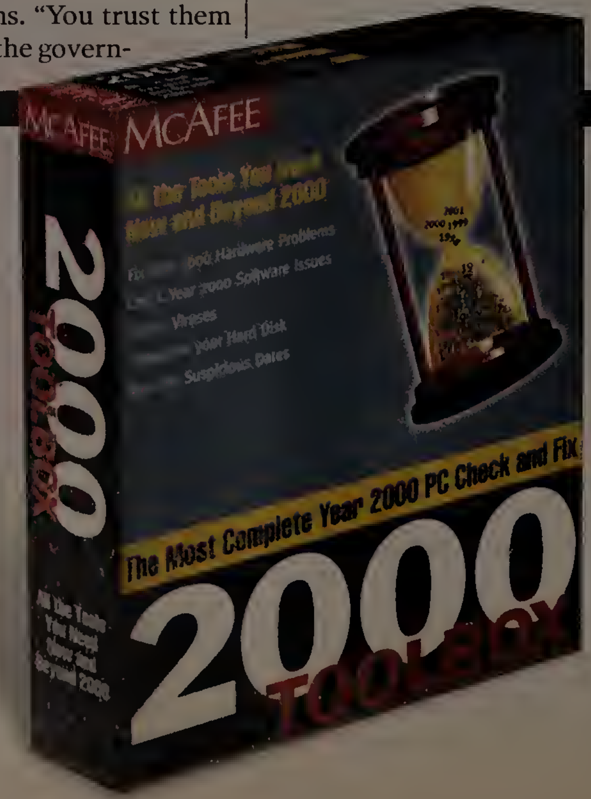
In general, the major programs work the same way. They check the system BIOS and system clocks using several key year 2000 dates; then they look at the various applications and data files on the system.

The packages walked me through some slight tweaks to the settings in each of my systems — a 233-MHz Pentium notebook and a 200-MHz Pentium desktop. Most then look for known flaws — two-digit date fields — in your installed applications, files and system software. The test packages draw on databases of problems identified by the program vendors and updated through the Internet. That could be a weak link in the chain because you are depending on major software vendors to post problems and their fixes. Kriebel notes that the key to making the test packages work is to keep running them against updated databases up until the new year.

Acknowledging that users may feel uncertain about the year 2000-compliance information the test packages draw from vendors, analyst Andrew Bochman at Aberdeen Group Inc. in Boston says a buyer should look for a vendor with a good track record. He says he's steering clients toward Norton 2000. "Symantec is a company that has been around, and we advise people to look for companies that will be around after the first of the year," he says.

I worked with the three test packages that appeared to be getting the greatest exposure from retailers. Of those three, I'd give Symantec Corp.'s Norton 2000 a slight edge over Network Associates Inc.'s McAfee 2000 Toolbox based on ease of use. Stay clear of the third package, Palladium Interactive's Detect 2000.





McAfee 2000 Toolbox

Network Associates Inc.
www.networkassociates.com
$29.95

There isn't a lot of difference between the Norton and McAfee products in terms of ease of use; both are acceptable. Give Norton the advantage in terms of its clear severity labeling and links to vendor pages and McAfee the edge in doing a better job of clustering problem reports under the application name.

However, McAfee did get off on the wrong foot with me. It lets you check off the tests you want to run, including an option for a virus check. Each time I ran it, the virus check crashed the application, giving me Windows' infamous "blue screen of death."

Both Norton and McAfee found multiple problems in Microsoft Access, particularly in the Northwind Traders sample templates. McAfee's reports give you a button that fixes problems, though you're never quite sure what fix is being made in the background. In some cases, the "fix" is simply an advice box that tells you to use four-digit date fields. Gee, wish I'd thought of that.

Detect 2000

Palladium Interactive
Acquired by The Learning Co.; product being discontinued

Heed the advice of Aberdeen Group's Andrew Bochman: You should seek out vendors that will stand behind their testing products after Jan. 1, 2000. When we went looking for test packages, the red box of Detect 2000 stood out on retail store shelves.

We already had a copy in the office, so I tried it. I found a nice, tab-style interface with a traffic-light-like warning system – red light meant it was bad; yellow, could be bad; green, good. Then I surfed the Net looking for more information on the product. Oops – Palladium had been acquired and the new owner of Detect 2000, The Learning Co., was dropping it. Look for a bright-red stop light if you see it at a retailer. It's an orphan.

Norton 2000

Symantec Corp.
www.symantec.com
$49.95

The initial install and tests with Norton 2000 took less than 30 minutes per machine. It performs an initial hardware check and examines system dates. In my case, it took only a couple of clicks to change a two-digit date setting to four digits with both Norton 2000 and Toolbox 2000.

One thing I didn't like about Norton 2000 was that, after the preliminary system checks, I noticed the small type that said I needed to make a BIOS reboot test disk to do a more thorough hardware test. I actually missed that warning the first time I used the product. The reboot test turned out to be only a five-minute process, in which the real-time clock was run against dates such as Jan. 1, 2000, and key leap-year dates through 2015.

When Norton 2000 looked at my applications and data, it did find some two-digit date fields. It rates problems on a "severity" scale, ranging up to 5 for the most serious problems. You can drill down through a tree structure to get notes about the types of problems and Web page references for information or fixes provided by the original software vendors.

The tough part is knowing what to do with the information; that's where the severity scale comes in handy. The most serious problems I spotted were in applications or data that I can either live without or expect to replace by year's end. ▶

BRIEFS

Sun Browser for Net Devices

Sun Microsystems Inc. has released Personal Applications Browser 1.0 for Internet-connected consumer devices such as smart phones, set-top boxes, car navigation systems and other handheld devices. The HTML 3.2-compliant browser lets users zoom to navigate Web pages on devices with limited display screens.

www.sun.com

Wintel Servers From Stratus

Stratus Computer Inc. in Marlboro, Mass., said it will deliver a range of Windows NT servers based on Intel Corp. chips early next year. Dubbed the Continium II series, the systems will initially be available in two- and four-processor configurations and will have high-availability features such as redundant power supplies.

Pricing for the servers will start at $40,000.

www.stratus.com

Supply-Chain Planning Software

Atlanta-based Mapics Inc. in June plans to ship supply-chain planning and scheduling software tied to its line of enterprise resource planning applications for midsize manufacturers with IBM AS/400 systems. Mapics developed the planning engine jointly with Symix Systems Inc., a Columbus, Ohio, application vendor that announced the tool in January with a different user interface.

Pricing is expected to start at $300,000.

www.mapics.com

KnowledgeSoft Upgrade

Mechanicsburg, Pa.-based KnowledgeSoft Inc. last week announced KnowledgeSoft 3.2, an upgrade of its Web-based training and management system. Version 3.2 has a new feature called a personal development plan that lets students collaborate with mentors and establish time lines for completing courses. It also lets administrators rank the importance of skills.

The upgrade costs $10 to $175 per user, depending on volume.

www.knowledgesoft.com

Traffic Analyzer For Web Sites

WebTrends Corp. has announced WebTrends Enterprise Reporting Server 1.0, software for analyzing Web-site traffic. The tool supports sites with more than 1 million hits per day, according to the Portland, Ore., company. It offers browser-based access to personalized Web analysis reports and supports the Linux or Solaris operating systems.

Included are more than 70 configurable tables and graphs. Reports can track traffic on a daily, weekly, monthly, quarterly or yearly basis.

The Solaris version costs $4,999; the Linux version costs $1,499.

www.webtrends.com

Tool Automates Paying of Bonuses

Incentive Systems Inc. in Burlington, Mass., last week released NT-based software that automates the job of calculating and paying commissions and bonuses to salespeople and other workers. The company's namesake software includes an embedded Web browser as its user interface and supports Microsoft Corp.'s SQL Server 7.0 database.

Pricing starts at $750 for each employee whose payments are managed by the software.

www.incentivesystems.com

FRANKLY SPEAKING/FRANK HAYES

Lessons from the Melissa mess

HURRICANE MELISSA whipped through IT shops worldwide last week. By the time you read this, the worst of Melissa's effects — from floods of virus-laden e-mail to gale-force gusts from professional windbags — should have passed. Now that we're through the mail-strom, all that's left is the mopping up. And maybe, if we're lucky, the learning of some lessons.

After all, e-mailed macro viruses are nothing new, and Melissa won't be the last. Until now, nobody's taken them very seriously.

They were kid stuff, just annoying little scripts that only bothered users at the desktop, right? But nobody thinks they're kid stuff any more — not with hundreds of thousands, maybe even millions of corporate users affected by Melissa. Now is the time to start recognizing some realities in the wake of a virus crisis.

Melissa should teach IT not to treat macro viruses as kid stuff.

The desktop will always be corporate information technology's Achilles' heel. Desktop PCs give users the greatest power to wreak havoc, corrupt data and introduce security problems — and they're furthest from the IT shop's fanatical focus on security and data integrity. That means we've got a choice: Either we stay close to users, making sure they understand the importance of being careful about risks such as e-mail viruses — or we let them drag us straight down the tubes when they screw up.

IT shops respond faster than antivirus vendors, who respond faster than Microsoft. We wish it weren't so. We count on vendors to stay on top of bugs, problems and risks so we don't have to. But when trouble comes fast, we find out about it first — and we're the ones who have to deal with it.

Antivirus software isn't bad, but it isn't enough. Vendors can't see the future, and they can't stop stupid user tricks such as opening Word documents attached to e-mail messages.

Automatic macro execution isn't worth it. Shut it off. It turns any Word or Excel document into a grenade — and you don't even know it's a grenade until it blows up in a user's face.

Word documents attached to e-mail aren't worth it, either — but good luck getting rid of them.

If you want to spread a virus, sex is the way to go. Melissa was reportedly launched from the *alt.sex* newsgroup. A related virus called Papa probably got its start in *alt.bondage*. Now you know where corporate America spends its spare time. If these viruses had been posted in *alt.business.internal-audit*, we might not have heard about Melissa and Papa until the year 3000.

Bad guys read the papers and respond. As soon as reports hit the news that a security patch would block any mail with Melissa's distinctive, "Important Message From" subject line, someone created a new version of Melissa — with the subject line left blank. When the papers reported Papa had a programming error that rendered it "sterile," some helpful soul corrected the bug and released the repaired virus. For people concerned with security, antivirus experts sure do have loose lips.

Users read the papers and get embarrassed. By last Monday or Tuesday they knew they shouldn't open e-mailed Word documents. If they did — and infected (or reinfected) their PCs — do you think they'd admit it?

Of course not. They'd just hope nobody noticed. Sure, they're idiots. But be sympathetic and offer embarrassment-free help — or you'll never get them to tell you about the problem. And you'll be mopping up after Melissa forever. ▸

Hayes, Computerworld's staff columnist, has covered IT for 20 years. His e-mail address is frank_hayes@computerworld.com.

HOT TRENDS & TECHNOLOGIES IN BRIEF

Spam

BY TIM OUELLETTE

DEFINITION

Spam is electronic junk mail from a person or company hawking goods or services to the millions of people using the Internet. Chances are if you have an e-mail account, you're getting spam. Typical subject headings include "Get rich Quick" and "Cheap Vacations."

As Internet commerce takes off, unscrupulous marketers are taking Internet junk mail, better known as spam, to a new level. They are filling users' e-mail boxes with messages about cheap vacations, get-rich-quick schemes and product sales pitches. In fact, spam fighters and Internet service providers estimate that between 10% and 30% of all Internet e-mail is spam.

It all started in early Internet chat rooms and interactive fantasy games where someone repeating the same sentence or comment was said to be making a "spam." The term referred to a *Monty Python's Flying Circus* scene in which actors keep saying "Spam, Spam, Spam and Spam" when reading options from a menu.

Spam may be annoying to users who waste time reading and deleting those e-mails, but to businesses, it means money.

For example, spam takes up valuable space on servers that could be used for business-related messages and data. The added e-mail load can also slow down networks and weaken performance of network applications.

But there are ways to combat those very pesky messages.

One is to complain to the spammer's Internet service provider. Most providers will react quickly to such complaints. And if the provider gets enough complaints, it will shut off a spammer's Internet access.

But it's not always easy to find which service provider the spammer uses. The trick is to read the headers at the top of the spam message, though spammers often forge addresses. Those with Unix systems can use the "traceroute" command, a utility that tracks the information from the receiver's computer back to the Internet host.

The best bet for messages that aren't on a Unix system is to look at the Received From line, which is in the header of the e-mail message. There could be multiple Received From lines because messages bounce through a few domains on the Internet. That information can give you signs of the true source of the message, says Alan Schwartz, author of *Stopping Spam* (O'Reilly & Associates Inc., Sebastopol, Calif.). "The Received headers in E-mail is the only thing you can trust that the spammer hasn't completely disguised, and you can only trust it so far," he says.

Another option is to push spam to the background, Schwartz adds. That's done by using the filtering features in your e-mail software.

Another front in the anti-spam crusade is government legislation. States and the federal government see spam as such a problem that they're looking at myriad ways to outlaw it (see chart, below left).

"A lot of us fighting spam lost faith in the ability of technology or social solutions to stop it, without the help of legislation," says John Mozena, spokesman for the Coalition Against Unwanted Commercial E-mail. The group is looking to treat spam like unsolicited faxes, which are illegal and can bring up to a $500 fine for each occurrence.

Mozena asserts that even with the many filtering products on the market, there's no silver bullet available to stop spam. ◗

Ouellette is a freelance writer in Scarborough, Maine.

Are there technologies or issues you would like to learn about in QuickStudy? Please send your ideas to QuickStudy editor Stefanie McCann at stefanie_mccann@computerworld.com.

TECH TIP

Fighting Spam

If you find a spam message in your e-mail in-box, here's what you can do about it:

- **Check the headers of the** e-mail for where on the Internet the message might have came from – any .com or .org tags, and so on. If you find a header, get information on it from the Internet Network Information Center, where users go to register site names on the Internet.
- **Make a complaint to the** service provider that the spammer is using when you have the domain of the original spam, usually from an Internet service provider's e-mail address. You can also post notices about spammers to Internet newsgroups like news.admin.net-abuse.misc or news.admin.net-abuse.announce to let others know about the spammers.
- **Delete the spam.** DO NOT reply to spammers if they offer to take you off their lists. This tells them you read their messages, and they will probably send more or sell your name to other spammers.
- **DO NOT mail-bomb** the spammer, because you will probably just hurt the Internet service provider and its users, not the spammer.

MOREONLINE

For more information about spam, visit our Web site. **www.computerworld.com/more**

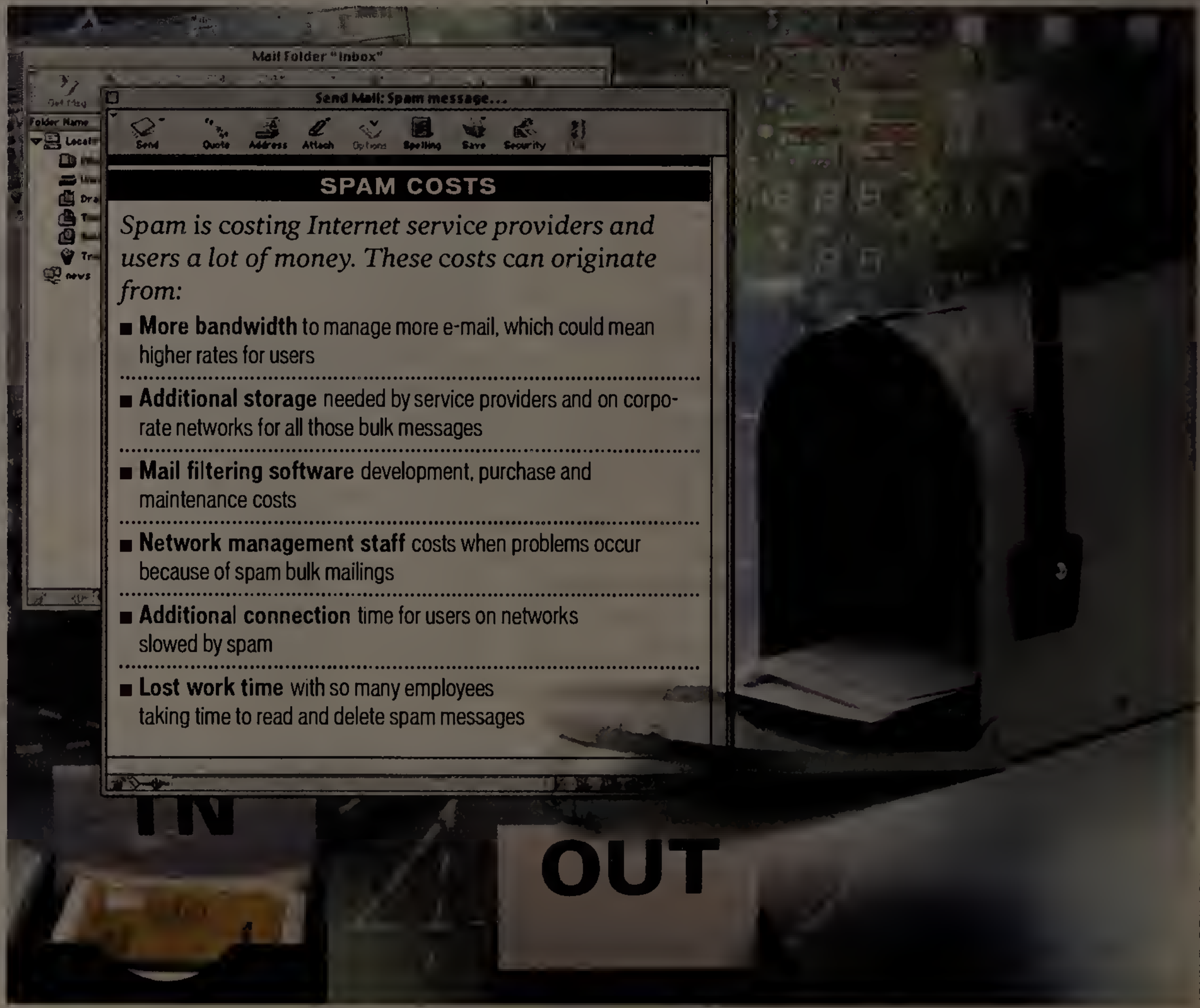
AT A GLANCE

Footing the Bill for Spam

Steps the government is taking to help curb spam:

BILL	STATUS	WHAT IT DOES
HR 1748	Pending	Prohibits unsolicited e-mail advertisements
HR 2368	Pending	Requires unsolicited e-mail advertisements to identify the sender
HR 4124	Pending	Prohibits sending unsolicited e-mail to subscribers of providers that prohibit them
HR 4176	Pending	Lets Federal Communications Commission create a universal exclusion and opt-out list, which is a way for people to be removed from mailing lists
S 771	Pending	Requires all commercial messages to be labeled as advertisements, and requires Internet service providers to block advertisements upon request
S 875	Pending	Restricts e-mail address harvesting
S 1618	Passed	Requires unsolicited e-mail senders to honor opt-out requests

SOURCE: JOHN MARSHALL LAW SCHOOL, CHICAGO

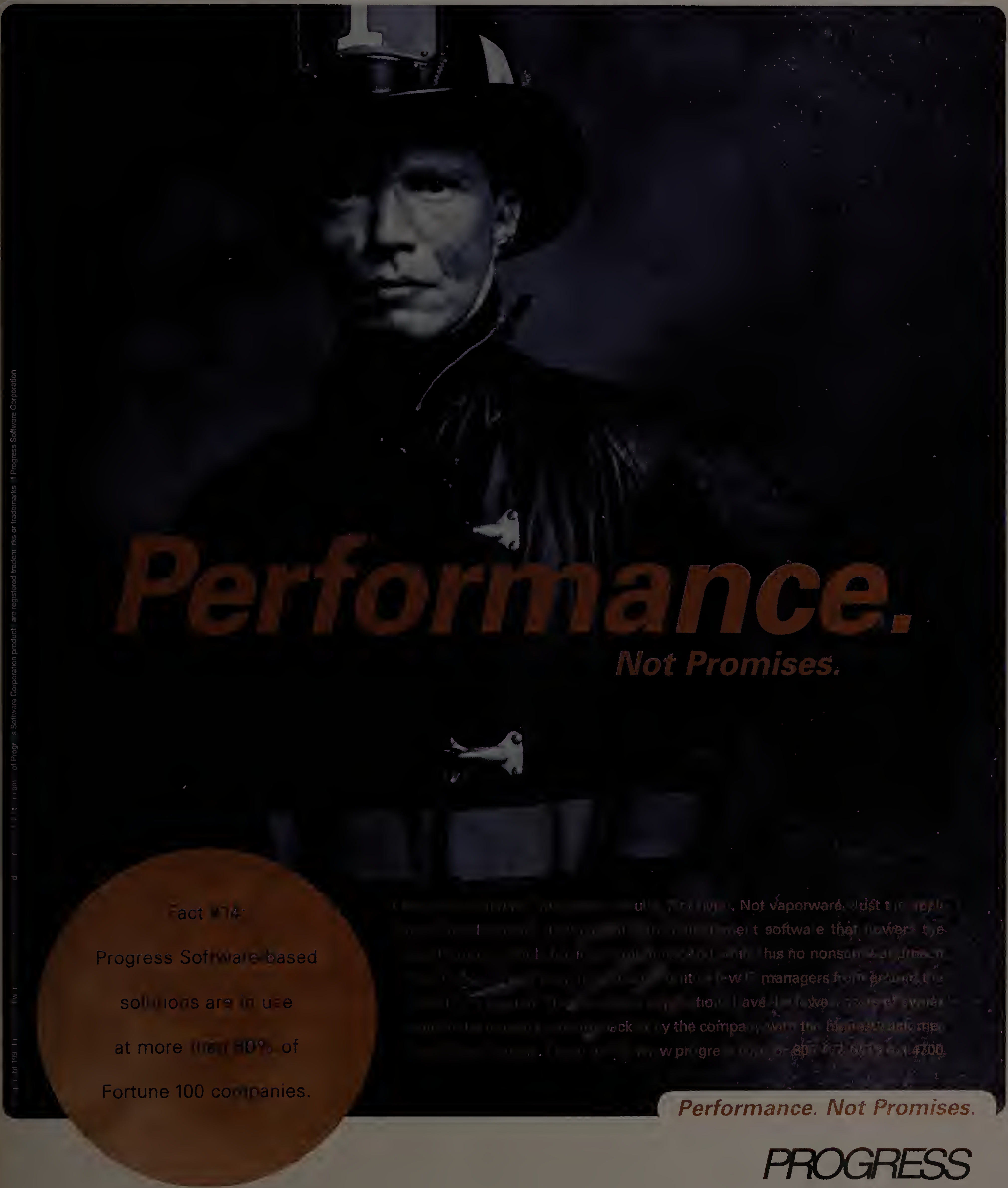


SPAM COSTS

Spam is costing Internet service providers and users a lot of money. These costs can originate from:

- **More bandwidth** to manage more e-mail, which could mean higher rates for users
- **Additional storage** needed by service providers and on corporate networks for all those bulk messages
- **Mail filtering software** development, purchase and maintenance costs
- **Network management staff** costs when problems occur because of spam bulk mailings
- **Additional connection** time for users on networks slowed by spam
- **Lost work time** with so many employees taking time to read and delete spam messages

JOHN R. BRILLON



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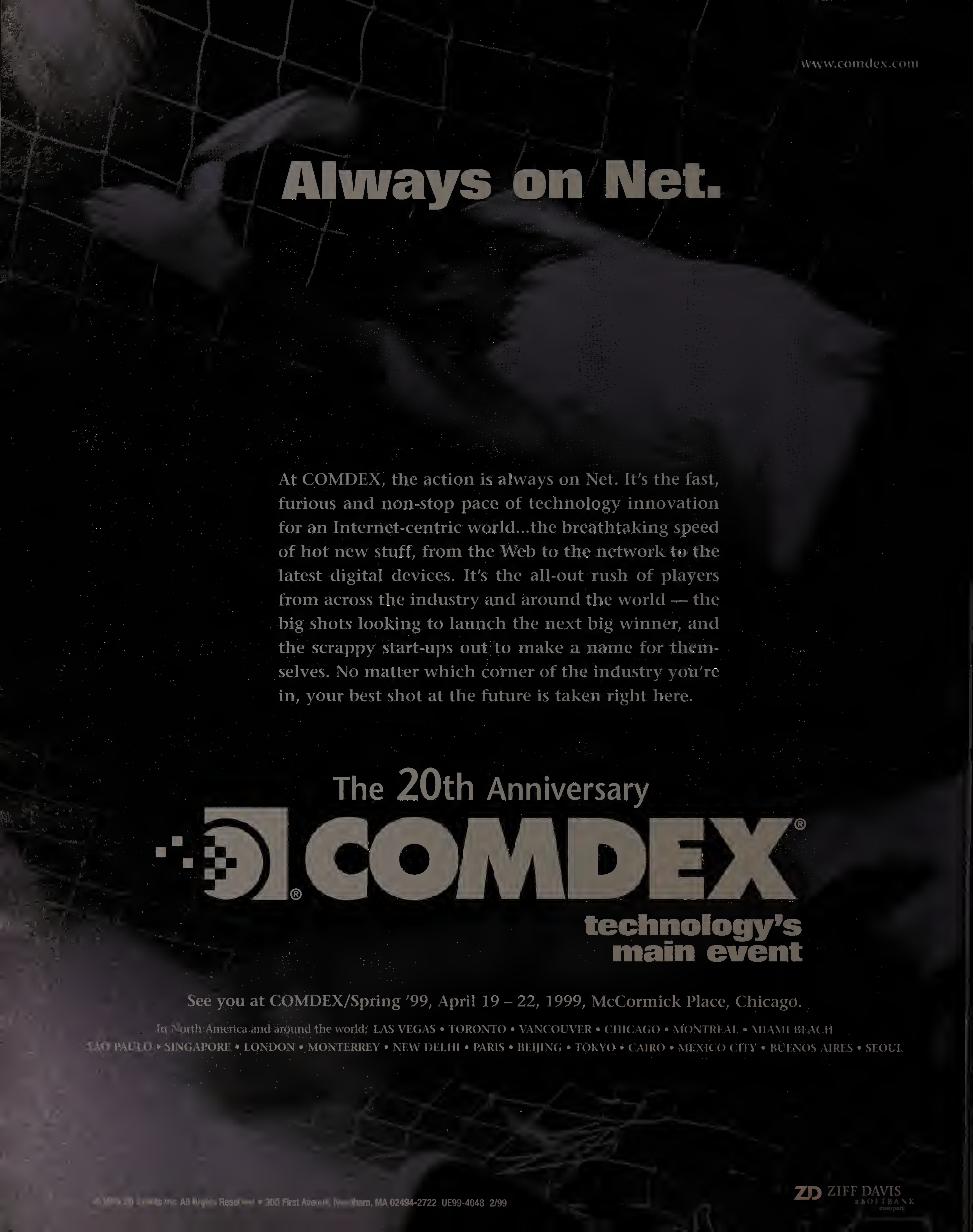

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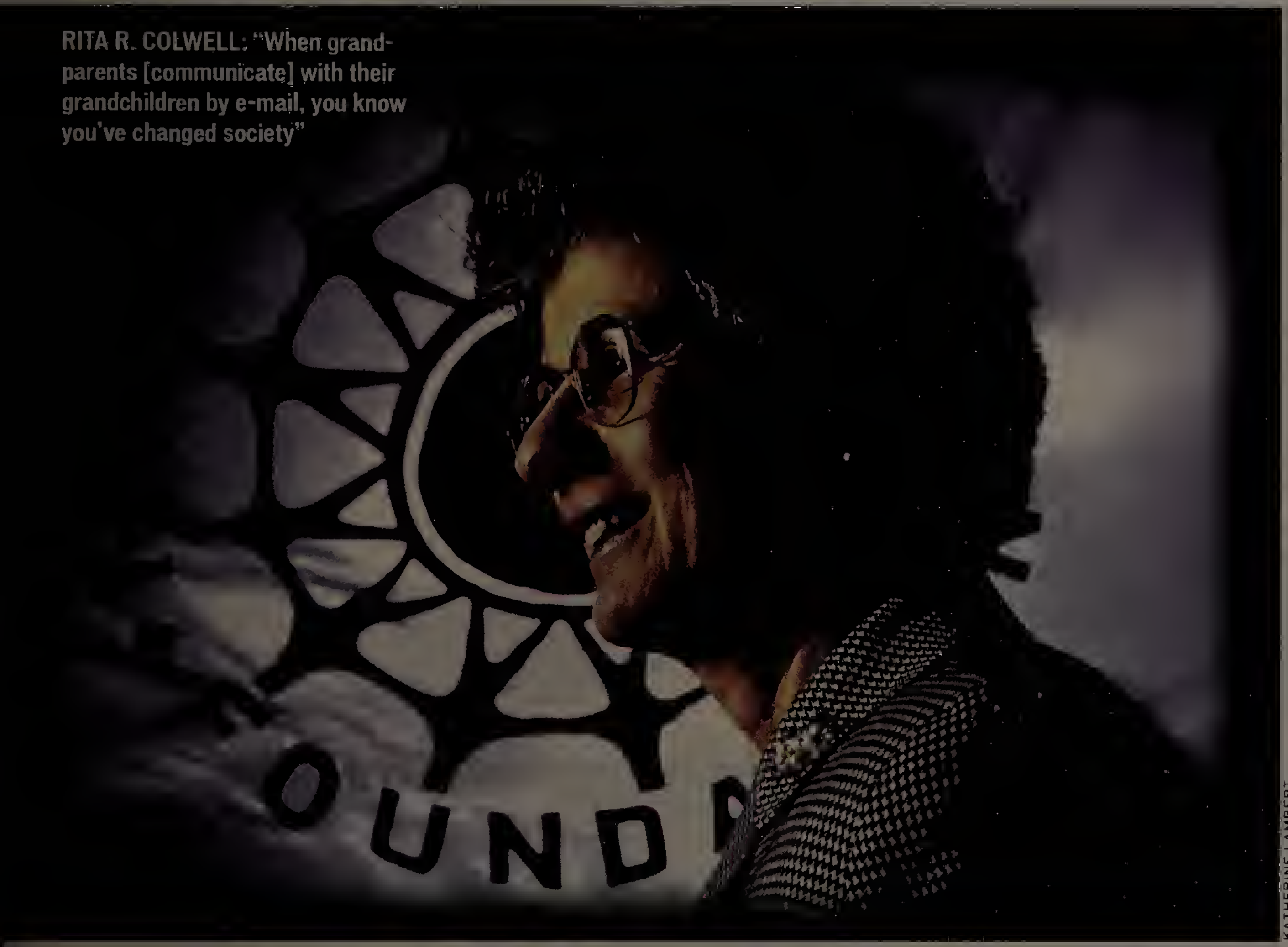

RITA R. COLWELL: "When grandparents [communicate] with their grandchildren by e-mail, you know you've changed society"

KATHERINE LAMBERT

The $366M Mandate

Last month, a panel of industry and university experts delivered to President Clinton a report charging that government spending on long-term information technology research "is seriously inadequate [and] has not kept pace with IT's growing importance to the nation." The report also said that an overemphasis on short-term problems "threatens the long-term welfare of the nation."

But the White House had a response: the Information Technology for the 21st Century initiative, which seeks $366 million in additional federal funds next year for basic research in IT. The interagency program is to be led by the National Science Foundation (NSF), which in August tapped **Rita R. Colwell***, an IT-savvy biologist, as its director. Colwell recently told* Computerworld *editor-at-large Gary H. Anthes why IT research matters at the $3.7 billion agency.*

Why is NSF funding for IT research important? What we do in IT fundamentally affects all of science. It's an investment across science and even across business and commerce. It affects the whole social structure.

WHO IS SHE?

Rita R. Colwell is director of the National Science Foundation, a past president of the American Association for the Advancement of Science, a former biology professor at the University of Maryland and the author of 16 books and 500 scientific publications.

Can you offer some examples? NSF-funded research in computation, chemistry and physics has led to magnetic imaging for detecting tumors. Research on voice-activated computers is tremendously useful for the disabled, and the work done in lasers has led to laser surgery for cataracts. What's been the most significant contribution of the NSF to IT? The Internet, derived from ARPAnet and NSFnet. The NSF picked it up [from the Advanced Research Projects Agency], made it a user-friendly and broadly communicating system and then spun it out into the commercial sector. Mosaic, the precursor of [Netscape Communications Corp.'s Navigator], was developed at [an NSF-funded supercomputer center]. When you have grandparents communicating with their grandchildren by e-mail, you know you've changed society.

How important is the Information Technology for the 21st Century initiative? It's not just an initiative, it's an imperative. We *must* make this investment. The NSF portion is $146 million — $100 million in software, $36 million in terascale computing and $10 million in ethical, social and IT workforce issues. By 2000, we'll spend $860 million annually on IT. It's a 40% budget increase for NSF's [IT] directorate.

What are some of the things that the investment will accomplish? New software will link 1,000 computers together to speed things up 1,000-fold, get us to terascale computing and prepare us for petascale computing. We need to develop off-the-shelf components so we will be able to build complicated systems in an efficient way by locking software components together. We also need to do research in the next kind of computer. It may not be silicon-based; it might be neurally-based or DNA-based. And we need to understand the social implications of being surrounded by computers and having much of our lives directed by computers.

How can the NSF help universities address the IT skills shortage? The number of women in computer science had been rising but is now falling. I find that very disturbing. We are funding a program in which girls mentor younger girls in the use of computers. That helps break down the barriers. Also, universities haven't connected with industry as well as they should. They need to find out better what industry needs. We might fund innovative programs for developing joint university-industry programs in, say, bioinformatics.

A presidential advisory panel recently said federal IT research is excessively focused on near-term problems. What's your response? Our mission is basic research. If it's close to a product, that's industry's task. If it's what industry won't fund because it's too basic — and we don't have the kind of research at places like [AT&T Bell Laboratories] and IBM that we used to — that's the responsibility of the NSF. Venture capitalists really aren't very venturesome; they want a guaranteed return.

How likely is it that Congress will approve the $366 million spending request? I'm optimistic. I've talked to a number of congressmen and senators, and they get it. ◗

Anthes' Internet address is gary_anthes@computerworld.com.

100 Years of IT

The IBM System 360. The IBM PC. Transistors. The photocopier

What information technology products had the greatest impact on our lives and businesses over this century? We asked for input from people with a broad range of interests in technology — prominent CEOs, analysts, educators, attorneys and *Computerworld* readers. Their verdict: The earliest vacuum tubes, rotary phones and office copiers were as ingenious and significant — and their effects as unexpected — as today's smart phones, high-definition TV, the Web and Pentium III chips. "The fundamentals of technology advances are predictable — circuits per inch, bits per second, cost per megabyte — but the applications are not," says International Data Corp. analyst John Gantz, a member of our panel. "That's because human ingenuity is involved."

Big Iron

The Electronic Numeric Integrator and Calculator (ENIAC) (1946) was the first large-scale, general-purpose electronic computer. Its offspring, the Univac I (1951), became a television star during the 1952 U.S. presidential election. But the mainframe that changed the face of computing and drew the most mentions from our panel of experts was the IBM System 360 (1964).

Before IBM began work on the 360 in the early 1960s, every new model required new hardware and software. But the 360 was designed as a family of compatible machines. "The 360 provided broad-based computing with standards," says Max Hopper, consultant and president of Max D. Hopper Associates. And Kroger Co.'s Michael Heschel, says the 360 "opened mainframe computing to the world."

But the 360 shares the spotlight with other key, large-scale computing innovations. The Hollerith paper punch card (1887) became a 20th-century mainstay of data storage — "the start of business systems analysis," says author and *Computerworld* columnist Paul A. Strassmann. The Manchester University Mark 1 (1948), affectionately known as "Baby," and John von Neumann's Electronic Discrete Variable Automatic Computer (EDVAC, 1947), the first stored-program electronic computer, were early steps forward.

The IBM 1401 (1959) was the first fully transistorized commercial computer. Digital Equipment Corp.'s PDP machines (1960) and IBM's Series 1 (1976) made departmental computing a reality. And Digital's VAX (1977) became the only real competitor to the 360 and its successors. Wang Laboratories Inc.'s word processing system (1971) brought computing power be-

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THE ASSOCIATED PRESS

A. The ENIAC, the first large-scale, general-purpose electronic computer
B. The precursor to the transistor, the vacuum tube
C. The IBM System 360 mainframe computer, Model 50

When we surveyed a panel of experts — along with visitors to *Computerworld*'s Web site — to help identify the 20th century's most significant information technologies, they brought us face to face with an important reality: IT isn't just computers or software. It's all the technologies that over the past hundred years have changed the way we gather, move and use information.

By Frank Hayes

Back
Forward
Location:
http

Television. Packet switching. The telephone. Credit cards. E-mail. The Web.

yond the data center for the first time. Key storage innovations included magnetic storage (1949), the IBM Ramac (1957) and the Winchester hard disk (1973). Underlying them all was Alan Turing's 1936 conceptual model for all stored-program computing, the Turing machine.

On the Desktop

If there was a single machine that made desktop computing a reality, it would have to be the IBM Personal Computer (1981).

IBM engineers designed the PC in a skunk works project in Boca Raton, Fla. — far from the center of IBM's mainframe-based universe in Armonk, N.Y. Cobbled together from standardized parts and borrowed ideas, the PC enjoyed instant success because of IBM's brand name — and its impact is a lasting legacy.

The PC "put computing power on the business desktop," says MIT research scientist Jeanne Ross. It ultimately "revolutionized business information and its use," Heschel adds.

Although the IBM PC was the desktop device most often cited by voters, there was no single machine that created desktop computing. Half a decade before the PC, electronics hobbyists could buy and build the MITS Altair (1975), the first microprocessor-based computer. The Apple II (1977), from Apple Computer Inc., was the first commercially successful off-the-shelf desktop computer.

At Xerox Corp.'s Palo Alto Research Center (Parc), the Alto (1972) and Star (1981) workstations pioneered the use of the mouse and graphical user interfaces. They were "the foundation of graphical user interface computing and graphic displays," Strassmann says. And a 1979 visit to Parc by Apple's cofounder and now-interim CEO, Steve Jobs, led directly to Apple's Lisa (1983) and Macintosh (1984).

The PC was built from standard parts — as was the Sun Microsystems Inc. workstation (1982) — and that standardization led to the creation of PC clones (1982).

Portable PCs led to laptop computers and handhelds, including the now-ubiquitous 3Com Corp. Palm (1996).

And home computers, including Atari Corp.'s Atari 2600 game machine (1977) and the Commodore 64 (1982) from Commodore Business Machines Inc., laid the groundwork for what would eventually be, as Erich Bloch, a fellow at the Council on Competitiveness puts it, "in every home and on every desktop — the universal appliance."

Out of the Labs

The transistor (1947) may be tiny, but its importance dwarfs nearly every other technological advance in this century. When researchers at AT&T Corp.'s Bell Laboratories discovered that a chip of semiconductor could replace a vacuum tube (1907), the transistor became "the basis of all technologies in the second half of this century," Bloch says.

The transistor was smaller, lighter, more durable and reliable than tubes, and it generated far less heat. Without it, "we'd be up to our ears in power plants to power all the triodes needed to fuel the Information Age," jokes Mark Pesce, chairman of the Interactive Media Program at the University of Southern California.

And transistors just kept getting smaller — first to form integrated circuits (1959) and then microprocessors. The first commercial microprocessor, the Intel Corp. 4004 (1971), was designed to power a desktop calculator.

100 Years of IT, page 76

100 Years of IT

Continued from page 75

Within a few years, a successor, the Intel 8080 (1974), was the brains behind the first desktop computer kit, the Altair.

While Motorola Inc. and other vendors competed with Intel, IBM developed the first RISC processors (1974), whose offspring would eventually power workstations from Sun, Digital, Hewlett-Packard Co. and Silicon Graphics Inc. Gallium arsenide chips (1974) promised blazing speed for communications applications, even though they never cracked the mainstream processor market.

Lasers (1960), once imagined as sci-fi death rays, got smaller, too — to become a core technology for both printers and communications. And although nanotechnology hasn't delivered its promise of molecular manufacturing, it may yet prove to be how a future generation of transistors is put to work.

F

D

The New Gutenberg

It wasn't the first xerographic copier; that was the Model A in 1949. But when the Xerox 914 — the first automatic, plain-paper office copier — appeared in 1959, it changed the face of information in businesses.

"Copying led to the standardization of paper. Fax and scanning were based from the acceptance of photocopiers. It's the way we think of record-keeping," says Peter G. W. Keen, chairman of Keen Innovations, a *Computerworld* columnist and one of many voters to cite copiers. In Strassmann's words, the 914 "made everyone a printer."

The fax machine itself, like the typewriter, dated from the 19th century. But both came into their own in 20th-century business. The electric typewriter (1933) gave way to the IBM Selectric (1961) and magnetic-card typewriters (1969). The Teletype teletypewriter (1920) made it practical to send typed information instantly across a wire and eventually found a place as a time-sharing computer peripheral.

The first commercial laser printer, the Xerox 9700 (1978), began a steady march toward the widespread use of laser printing. And the flat-panel display offered the first step toward a screen as convenient as the Xerox copy.

Information Everywhere

Is there any promise the World Wide Web can't fulfill? Ten years ago, it didn't exist. Last year, "it accounted for one-third of [U.S.] economic growth, according to the White House," says Robert Kahn, president of the Corporation for National Research Initiatives.

"It has become telephone, loudspeaker, radio, television, cinema, phonograph, doctor, village square and lover," USC's Pesce argues.

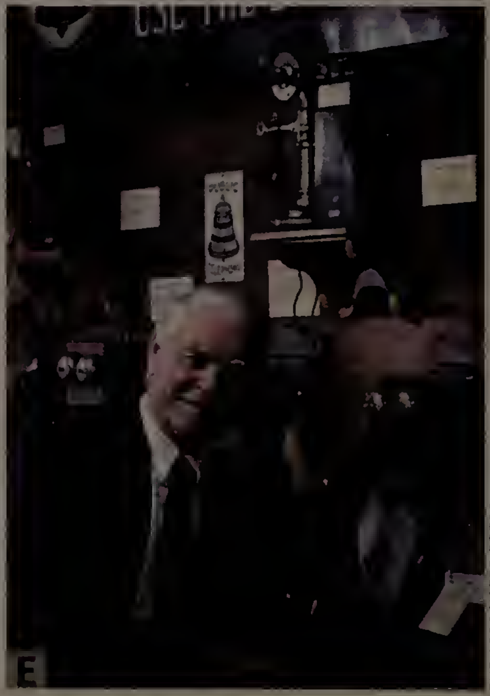
All this from an idea first suggested in August 1990 by researchers Tim Berners-Lee and Robert Cailliau at Switzerland's CERN, the European Laboratory for Particle Physics, who thought it would be useful for "document registration, online help [and] project documentation." By October, they had a prototype Web browser. By early 1993, there were 50 Web servers worldwide. Within 18 months, that number had increased thirtyfold and was growing too fast to be counted accurately.

The nuts and bolts of the Web are now household words: HTML, URLs, browsers — especially Netscape Communications Corp.'s Navigator, which "made e-commerce serious business," Ross says.

Of course, without the Arpanet network (1968), created by the U.S. Department of Defense to connect its researchers, and the TCP/IP protocol (1975) that gave the Internet its name, the Web would have no road to run on. But when the National Science Foundation opened the Internet to commercial use in 1991, no one could expect what the Web would ultimately become.

On the Air

Until the arrival of the Web, only one form of information technology could claim to have revolutionized 20th-century life. And broadcasting hardly seemed like a world beater in 1920 when Westinghouse Electric Co.'s station KDKA in Pittsburgh reported the U.S. presidential election returns during the first broadcast of a regularly transmitting commercial radio station.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By 1924, there were 600 commercial radio stations — and the number grew so quickly that in 1927 the Federal Communications Commission was created to regulate them. Television began to come into its own in 1937, when the British Broadcasting Corp. began regular, electronic television broadcasts. The first transistor radio (1952) made portable wireless communications a practical reality and proved a commercial use for transistors.

How far-reaching was broadcasting's effect? "It's how the country got homogenized and information was transmitted," says Gary Reback, an antitrust attorney at Wilson Sonsini Goodrich & Rosati. "This has enabled mass communications and changed most people's living and learning habits in profound and subtle ways," Kahn adds.

"It brought world events to business and to the home," Heschel says.

The wireless Morse code transmissions that Guglielmo Marconi demonstrated in 1901 were largely overwhelmed by the voice radio demonstrated five years later by Reginald Fessenden. Nonetheless, today wireless data networks and spread-spectrum technology transmit more data than voice despite the growth of mobile and cellular phones — "the fastest-adapted of all innovations," Keen says.

Before the Internet

Telegraphs had sent messages across wires since the early 19th century, and packet switching — a system for breaking messages into pieces and routing them automatically — was first proposed in 1961. When Bolt, Beranek & Newman developed the IMPS packet switch for Arpanet in 1968, modern networking became a possibility.

But with Ethernet (1973), networking became a reality. Robert Metcalfe's system, tested at Xerox Parc, made it possible to connect large numbers of devices to a local network because each device "listened" before sending and detected when its messages collided with those of another sender.

Ethernet was "the basis of a distributed computer architecture," Strassmann says.

The 3Com EtherLink (1982) was the first network adapter card for the IBM PC. The Cisco Systems Inc. router (1986) added intelligence to the switches delivering messages between networks. And Asynchronous Transfer Mode made it practical to mix time-sensitive traffic such as voice and video over the same networks as ordinary data.

No More 'Number, Please'

The telephone, mentioned in some way by a third of our voters, was already having its impact on business communication and information technology by 1900. So, in fact, was the device that would launch the networking revolution more than half a century later: the Strowger telephone switch (1889).

The story almost seems like slapstick comedy: Almon Strowger, a Kansas City, Kan., undertaker, hired several engineers to design an automatic telephone switch when he suspected local operators were steering business to his competitors. That switch — and a telephone that could be dialed to operate it (1896) — were adopted by AT&T in 1916, making it possible for businesses to dial their own calls.

The Strowger switch "gave us the concept of switching," Keen says. And the dial telephone itself "changed our reach and range," Ross says.

Although the dial telephone let businesses direct their own switching, the Touch-Tone phone — invented in 1941 but made practical only by transistors in 1964 — "enabled the telephone to become a data-entry device," says CIO Communications Inc. publisher Joe Levy.

The four-prong telephone jack made it possible for customers to use different telephones interchangeably. Answering machines and voice mail let telephone users leave messages when no one could answer the phone. Modems (1957) made the connection between phones and computers, and the digital telephone network (1986) completed that connection.

Software

As software goes, e-mail may not seem like much. We don't turn to it to

100 Years of IT, page 78

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> [The Web] has become telephone, loudspeaker, radio, television, cinema, phonograph, doctor, village square and lover.
>
> **MARK PESCE, CHAIRMAN, INTERACTIVE MEDIA PROGRAM, UNIVERSITY OF SOUTHERN CALIFORNIA**

NETWORK
YES
NO

D. The Xerox 914 copier
E. Jimmy Smith, founder of the Georgia Rural Telephone Museum in Leslie, Ga.
F. The rotary phone
G. The transistor
H. The Pentium III chip
I. A PC clone
J. HDTV
K. An early television
L. A cellular phone

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100 Years of IT

[Credit cards] fundamentally transformed us to a symbol economy.

PETER G. W. KEEN, CHAIRMAN, KEEN INNOVATIONS

M. Microsoft's Windows software
N. The IBM RS 6000 mainframe computer
O. An early IBM Personal Computer

Continued from page 77

produce something, as with a word processor or spreadsheet. But e-mail may have had a greater impact — forcing business executives to learn to type and encouraging grandparents to climb aboard the Internet.

"I believe e-mail has changed how we communicate, who we communicate with and what we communicate about. And maybe I'm an IBM bigot, but I think PROFS [Professional Office system from IBM] got it rolling," Ross says.

PROFS — which remained the king of e-mail for years after PC-based mail systems were introduced — has been eclipsed by Internet mail systems.

But other software innovations are still making their mark. Relational databases, data compression, artificial intelligence and digital imaging are so common — and crucial — that we don't even notice them. And virtual reality has changed the way we interact with computers.

Among the many software products that have been key to IT: Multics ("the first real operating system," Pesce says); Windows; Novell NetWare; Unix; Linux; CP/M; Mac OS; Digital's VMS; the Oracle and DBase II databases; IBM's CICS transaction monitor; Visicalc, Lotus 1-2-3 and Microsoft Excel spreadsheets; word processors; and Cobol, C, C++, Java and Visual Basic.

Beyond Bits and Bytes

When the first credit card hit New York in 1946, few people would have identified it as information technology. Even today, "plastic money" usually seems more like a contributor to electronic commerce than IT itself.

But credit cards "fundamentally transformed us to a symbol economy," Keen argues. "Without that experience, we couldn't have an information economy. The Internet rests on the credibility of credit cards."

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Our expert panel made other unconventional choices for key IT products, too. The automobile "led to suburbanization of the world," Bloch says. The elevator "made skyscrapers possible," says Jim Ware, vice president of The Concours Group. The airplane made Federal Express Corp.'s overnight package delivery possible — and closed the speed gap between paper and electronic communications. Gene-splicing and the human genome project are already changing key information of a different sort.

But perhaps the most familiar of unconventional IT innovations comes from, of all things, office furniture. In 1964, Herman Miller Inc. rolled out its Action Office system, introducing corporate America to "open-plan" offices intended to improve communication and information flow. The result, says Duncan Sutherland, chief technology officer at Wilmer, Cutler & Pickering, "ultimately devolved into the now more or less ubiquitous Dilbert cube!" ▶

The Panel of Experts

To identify the top IT products and technologies of the century, we surveyed experts with a broad range of interests. Members of our 21-member panel ranged from the chairmen of large technology companies to consultants and educators. We also solicited input from everyday readers with an online survey at *Computerworld*'s Web site.

Special thanks to our expert panel:

Paul Allaire, chairman and CEO, Xerox Corp.

Ruzena Bajcsy, assistant director, National Science Foundation

James Barksdale, CEO and president, Netscape Communications Corp.

C. Gordon Bell, senior researcher, Microsoft Bay Area Research Center

Erich Bloch, distinguished fellow, Council on Competitiveness

Lewis Branscomb, director emeritus, Harvard University's Kennedy School of Government

John Gantz, vice president, International Data Corp.

Mark Gembicki, president, WarRoom Research Inc.

Michael Heschel, executive vice president of information systems, Kroger Co.

Max Hopper, president, Max D. Hopper Associates

Robert Kahn, president, Corporation for National Research Initiatives

Peter G. W. Keen, chairman, Keen Innovations

Joe Levy, president and CEO, CIO Communications Inc.

Bob Metcalfe, vice president of technology, International Data Group

Nicholas Negroponte, founding director of the MIT Media Laboratory

Mark Pesce, chairman, Interactive Media Program, University of Southern California

Gary Reback, attorney, Wilson Sonsini Goodrich & Rosati

Jeanne Ross, principal research scientist, MIT Center for Information Systems Research

Paul A. Strassmann, CEO, Software Testing Assurance Corp.

Duncan Sutherland, chief technology officer, Wilmer, Cutler & Pickering

Jim Ware, vice president, The Concours Group

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Degree of Distinction

BY LESLIE GOFF

A SPIRITED, irascible salesman left IBM in 1962 to start a new kind of computer company. Thirty years later, still spirited, still irascible, he would start his own political party and run for president of the U.S.

In between, H. Ross Perot generated more publicity than you can shake a stick at. But Electronic Data Systems Corp. (EDS), the Dallas-based company he founded on his 32nd birthday — June 27, 1962 — with a $1,000 loan from his wife Margot, remains one of the most significant contributions by an individual to the development of the information technology industry. Only time will tell if his Reform Party will have the same impact on the two-party U.S. political system.

H. ROSS PEROT began EDS, one of the first full-service computer services shops

Before EDS, a number of computer services bureaus had cropped up, offering data processing services for monthly contracts of about $500 each.

But Perot envisioned a computer services firm that would offer a cradle-to-grave information services pact at a prearranged price, on a prearranged schedule, via a long-term operating agreement, as he explained in an article in the June 22, 1992, issue of *Computerworld*. He pitched the idea to his employer, IBM. When IBM declined, Perot struck out on his own.

Frito-Lay Inc. stepped up to be EDS' first customer in a $5,128 deal. EDS' next contract was nearly double the value of the first.

At about the same time in 1962, far north of Dallas in the college town of West Lafayette, Ind., something else was happening that would also have a profound effect on the IT profession. Purdue University — three years before Stanford University and Carnegie Mellon University — established the first computer sciences degree program.

Embedded in the math department, the fledgling master's and doctorate program in computer sciences attracted two dozen students that first year, says Sam Conte, chairman of the degree program from its inception until 1979.

"Most scientists thought that using a computer was simply programming — that it didn't involve any deep scientific thought and that anyone could learn to program. So why have a degree?" Conte says. "They thought computers were vocational vs. scientific in nature."

1962

As with so much in the early history of computing, computer sciences degree programs were driven largely by the Cold War. Purdue followed the lead of the National Science Foundation (NSF), which in the late 1950s said the U.S. was falling behind the U.S.S.R. in science. To stimulate more research, the NSF began funding the acquisition of computers by universities. That, Conte says, was the turning point.

Felix Haas, who had just been named chairman of Purdue's mathematics department, had the then-novel idea that math should be broadened to be as much a science as an art and that the university should embrace applied math, statistics and computing. That idea drew skepticism from Haas' colleagues in the math department. But, spurred on by the potential money to be gained from the NSF, the board of trustees approved Haas' proposal to create a computing-related degree.

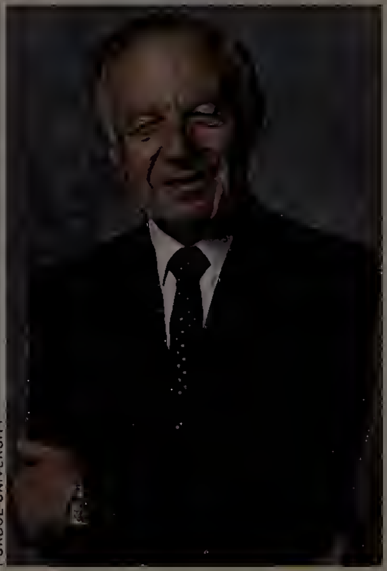
Haas turned to Conte to form the new program. Conte, then the head of programming at TRW Inc., brought several of the program's first crop of students with him from the West Coast. Others transferred from within Purdue's math and engineering departments. Several students also applied from outside the school.

"It was not hard to attract students because everyone knew about computers," Conte says. "But it was very hard to attract faculty because there were no 'computer scientists' at that time — just knowledgeable people who had jobs in industry and had learned computing on their own."

Also difficult was naming the program, which stirred up quite a debate, Conte recalls. Some preferred information technology, others computer technology. Ultimately, the program was named computer sciences.

"Computer sciences sounded more weighty for the skeptics," Conte says.

Taken together, the creation of EDS and the emergence of the first formal program to study computing cemented the relationship between information technology and business.



PURDUE UNIVERSITY

PURDUE'S SAM CONTE: His computer sciences program drew some of the nation's best math and engineering students

"I remember going to a conference about that same time and listening to Ross Perot talk," Conte says. "I thought he was very eager and had a great idea in mind there with EDS. I wasn't sure he could pull it off, but he proved me wrong. He did pull it off."

So did Conte and Purdue. ◗

Goff is a frequent contributor to Computerworld. *Contact her at lgoff@ix.netcom.com.*

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Technology Happenings

- **The LINC (Laboratory Instrumentation Computer)** offers the first real-time laboratory data processing.
- **Three MIT students create the first interactive video game,** "Spacewar!" The computer used, a Digital Equipment Corp. PDP-I, cost $120,000.
- **IBM**, with **American Airlines**, begins implementation of **Sabre** — Semi-Automated Business Research Development — linking high-speed computers and data communications to handle seat inventory and passenger records.
- ***The New York Times*** sends pages to its Paris edition via photo facsimile.
- A team, under the direction of Tom Kilburn at the **University of Manchester in England**, develops **virtual memory**.

Born in 1962

- **Matthew Broderick** — actor, *War Games*
- **Jackie Joyner-Kersee**, Olympic athlete
- **Leslie Goff**, *Computerworld* Flashback writer

Other Notables

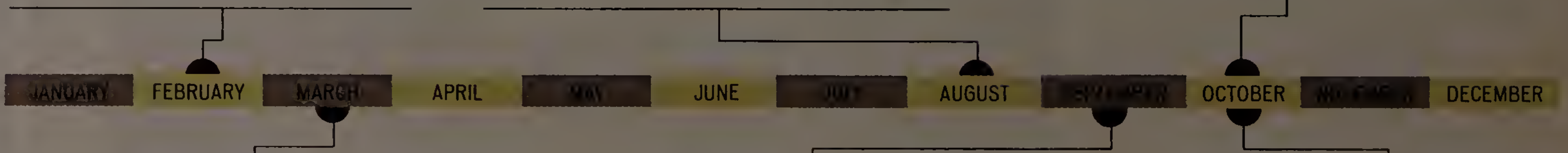
- **John Steinbeck** receives the Nobel Prize for Literature.
- **Year-end Dow Jones Industrial Average:** 652.10
- **Best Picture:** *Lawrence of Arabia*
- **Sam Walton** opens the first Wal-Mart in Rogers, Ark.; **Sebastian Kresge** opens the first Kmart in Garden City, Mich.
- **Bob Dylan** releases his first album, *Bob Dylan*.
- **Ringo Starr** joins the Beatles; the group releases its first hit, "Love Me Do," in the U.K.

▲

Johnny Carson succeeds Jack Paar as regular host of NBC's *The Tonight Show*.

John Glenn becomes the first American to orbit Earth; he orbits three times in less than five hours.

Marilyn Monroe, 36, is found dead in her Los Angeles home; her death is ruled a "probable suicide" from an overdose of sleeping pills.



The Soviet Union accuses the U.S. of fighting an "undeclared war" in Vietnam and demands the removal of U.S. forces.

African-American student James Meredith succeeds in his fourth try to register for classes at the University of Mississippi.

The Cuban Missile Crisis begins. President Kennedy declares an end to the crisis in November.

■ Flashback is produced with the assistance of The Computer Museum History Center in Mountain View, Calif.

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Source Code: MS39

IT Pros Get Behind the Wheel

Home to more than the auto industry, Michigan, the Great Lakes state, needs all kinds of IT skills By Candee Wilde

If thoughts of Michigan bring to mind bitter-cold winters and old, industrial cities dominated by auto manufacturers, it may be time to reassess the mitten-shaped Midwestern state.

Michigan is home to more than 5,000 information technology firms, and state organizations are actively recruiting additional software, hardware and telecommunications firms, according to the Governor's Innovation Forum.

That focus on IT, coupled with a strong state economy and low unemployment, is creating a broad spectrum of job openings for IT professionals, says Katherine Willis, president of Cyberstate.org, a nonprofit group formed to help Michigan's business, education, health care, government and philanthropic communities incorporate information technology. Midlevel and entry-level IT professionals are in particularly strong demand, Willis says.

In Detroit, the largest city in Michigan and the 10th-largest in the nation, opportunities abound for IT professionals. Leading the hiring demand are the Big Three automakers, their suppliers and the multimedia advertising industry, experts say. Companies in other major cities — Ann Arbor, Grand Rapids and Lansing — have IT jobs to offer people who prefer smaller communities. The following is a look at the IT job market in Michigan's major cities. ▶

Wilde is a freelance writer in Easton, Conn.

Salaries in the Detroit Area

The following are base salaries (without bonuses) for key IT jobs.

JOB TITLE	1-2YRS	3-4YRS	4+YRS
Computer operations manager	$55K	$67K	$76K
Network administrator	$451K	$55K	$59K
LAN manager	$43K	$54K	$66K
Project manager	NA	NA	$78K
Senior systems analyst	NA	NA	$66K
Senior programmer/analyst	$49K	$56K	$60K
Programmer/analyst	$34K	$40K	$57K
Computer operator	$27K	$33K	$36K
PC technical support specialist	$30K	$38K	$44K

SOURCE: *COMPUTERWORLD*'S 1999 MIDYEAR SALARY SURVEY

DALE FISHER

Detroit

EMPLOYMENT OPPORTUNITIES: Spurred by a strong economy, both large and small firms have opportunities for IT people. Most wanted: Workers skilled in Oracle database development, electronic commerce, client/server development and mainframe environments. "Detroit has a dispersed economic base that includes health care, banking and distribution," says Michael Shebak, vice president at Kelly Information Technology Resources, a division of Kelly Services Inc., headquartered in the Detroit suburb of Troy.

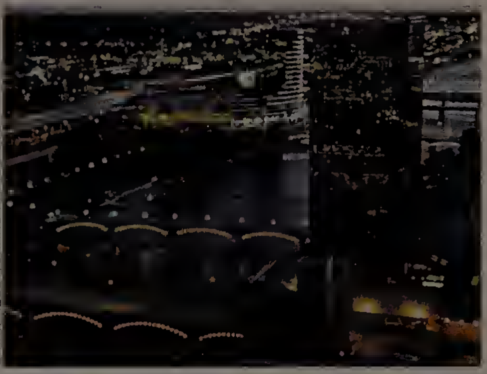
QUALITY OF LIFE: Downtown Detroit is undergoing a renaissance, thanks to investments from the private and public sectors. Surrounded by beautiful suburbs, the housing is affordable and the cost of living is moderate. Winter here, and throughout Michigan's Lower Peninsula, is comparable to winters in New York or Boston.

MAJOR EMPLOYERS: The Big Three automakers, St. John Health System, Northwest Airlines Inc. and Comerica Bank

POPULATION: Greater Detroit: 4 million

MEDIAN HOME VALUE: $69,260

UNEMPLOYMENT: 4.1%



BRIAN KELLY/GRAND RAPIDS CVB

Grand Rapids

EMPLOYMENT OPPORTUNITIES: Demand for IT workers with year 2000 skills is beginning to slow. But IT people with networking experience and knowledge of client/server application development should find many openings, says Charles Zarzecki, manager of data processing at the Grand Rapids division of Thorn Apple Valley Inc., a meat processing company. The community is growing rapidly and expansion is especially notable in the biotechnology, banking, insurance and furniture-making industries – all of which are applying IT to their business in increasing measure, experts say.

QUALITY OF LIFE: Grand Rapids is just 40 minutes from Lake Michigan. Boating is popular. Residents enjoy a small-town lifestyle, short commutes and a strong economy.

MAJOR EMPLOYERS: Steelcase Inc., Spartan Stores Inc. and the world headquarters of Amway Corp.

POPULATION: City of Grand Rapids: 192,000; Kent County: 538,500

MEDIAN HOME VALUE: $90,000

UNEMPLOYMENT: 3.2%

ANN ARBOR CHAMBER OF COMMERCE

Ann Arbor

EMPLOYMENT OPPORTUNITIES: Ann Arbor is home to several hundred small and midsize high-tech firms – so many that an area slightly north of the city has become known as Automation Alley. A wide range of IT jobs is available.

"I can't think of a technology that isn't in demand here," says Fred Schanne, vice president of operations at Ajilon Services Inc., which hires IT professionals to fill positions at companies in the area. "Companies are trying to install the latest, greatest architectures. But they can't throw away what they already have, so they need people with a foundation in both sides of IT."

QUALITY OF LIFE: Home to the highly respected University of Michigan, Ann Arbor boasts a highly educated workforce – residents over age 25 have an average of 14.6 years of education, more than any other city in the nation.

MAJOR EMPLOYERS: General Motors Corp., Ford Motor Co. and Parke-Davis, a pharmaceutical division of Warner Lambert Co.

POPULATION: 305,102

MEDIAN HOME VALUE: $166,747

UNEMPLOYMENT: 1.4%

GREATER LANSING CVB

Lansing

EMPLOYMENT OPPORTUNITIES: Companies in Michigan's capital city are especially eager to find PC network administrators and LAN/WAN managers, says Gerry Hirshman, manager of information systems at Lansing-based Michigan Millers Mutual Insurance Co. But midlevel and veteran IT professionals will also find a wide range of other opportunities here.

"There seems to be a lack of qualified IT people in Lansing," says Hirshman, whose company is currently seeking a "high-level networking person."

QUALITY OF LIFE: Lansing is the seat of Michigan's state government and home to Michigan State University. Lansing features the amenities expected in bigger cities, with less crime and shorter commutes, according to city officials. Quiet suburbs are easily accessible.

MAJOR EMPLOYERS: State of Michigan, General Motors Corp., Michigan State University and Meijer Inc.

POPULATION: 445,000

MEDIAN HOME VALUE: $51,100

UNEMPLOYMENT: 3.2%

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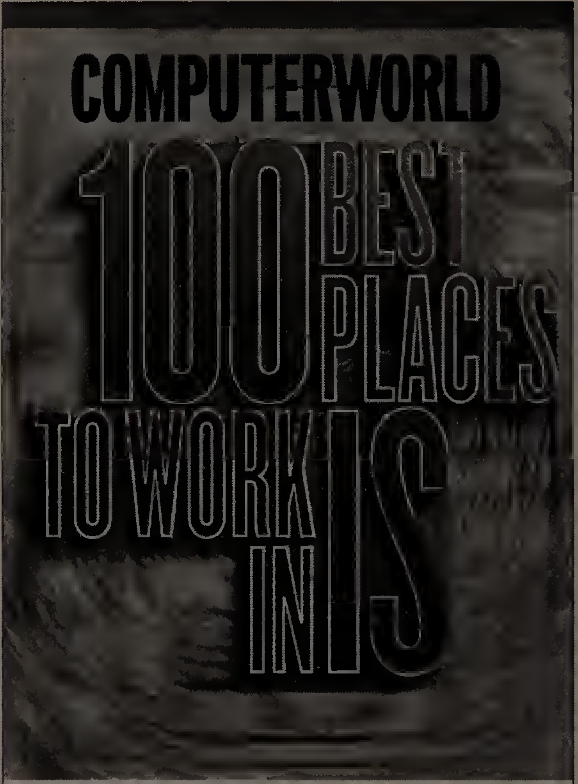

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Software Engineer (FT)--Full life-circle design & development of multi-tier distributed internet, client/server enterprise solutions. The responsibilities include: design and create a core technology (EAPI) necessary for applications team, customers, and third parties; develop software using Design Patterns, UML, Distributed Objects, Role Bases Security, Java, Netscape Enterprise Server, LDAP, SSL, ActiveX technology, and OODB, together with RDBMS, Server Side JavaScript, HTML, ODBC/DAO, & Transact SQL. Implement EAPI in C++, ATL, Visual C++, Java, & Visual Basic 6.0. The ongoing responsibility is to extend and maintain the existing code base and assist with building second-generation API products. Rational Rose is used as the Case Tool. Req: MS in Computer Science /Engineering or related engineering field & a minimum of 1 yr exp. in job described. Salary competitive. Send Resume referencing job #H100 to: M. Wilson @ EMPLOYEASE, Inc., One Piedmont Center, Ste. 500, Atlanta, GA 30305 or mwilson@employease.com. EOE.

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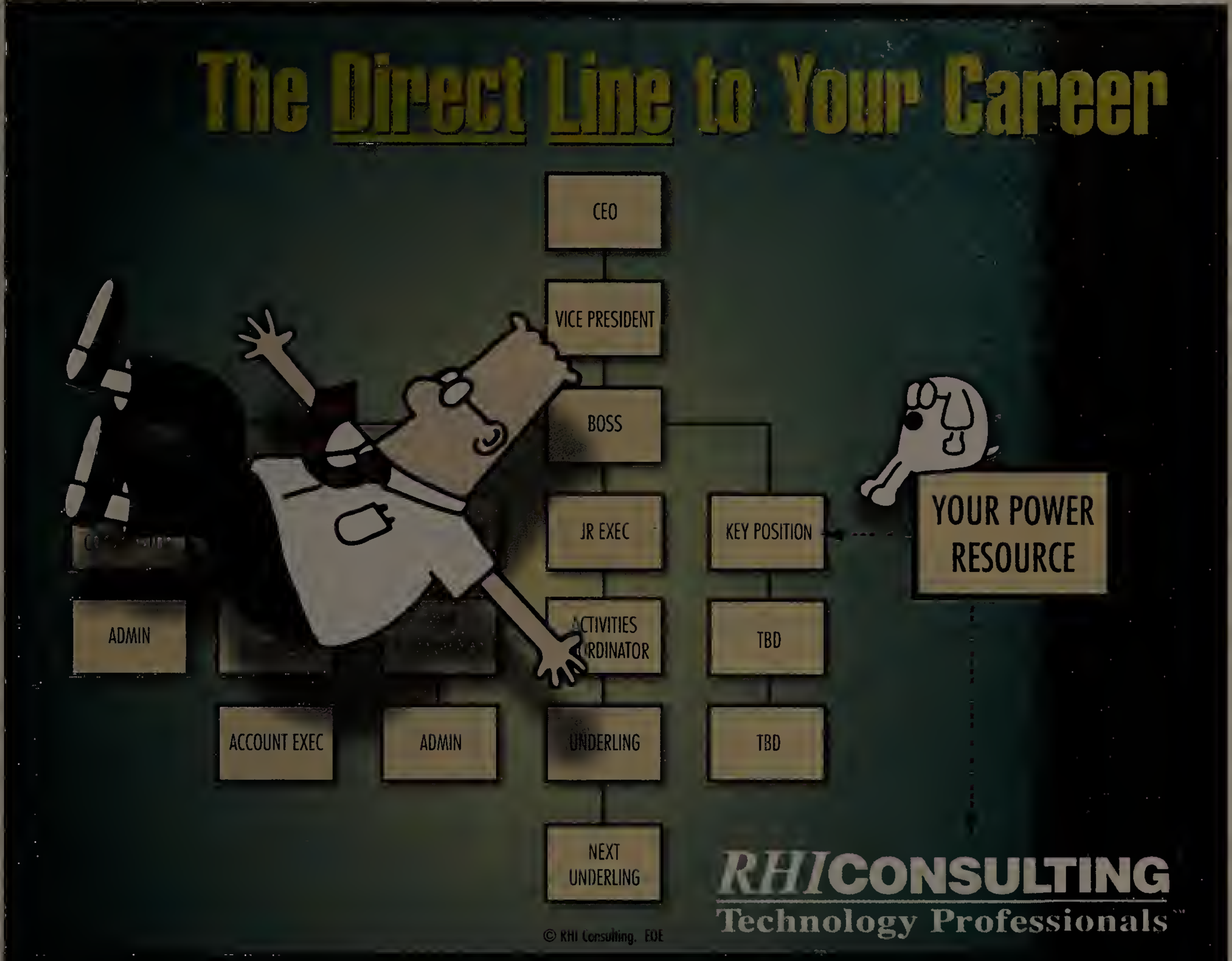
Senior Software Engineer (3 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience in job offered or as a computer professional and one year of experience using: 1 of Group A and 1 of Group B and 1 of Group C; **OR** 1 of A and 2 of B; **OR** 1 of A and 2 of C as follows: Group A - Windows 3.1, Windows 95, Windows 98, Windows NT, UNIX, HP-UX, IRIX, Sun OS; Group B - Visual C++, Visual C, C, C++, Visual Basic, PowerBuilder; Group C - JAVA, TCP/IP, HTML, MFC, CGI, PERL, ASP, COM/DCOM, Active X, MTS. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics. Will accept B.S. degree with five years of experience as computer professional. Salary is $75,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Washington Job Center Manager, Millcraft Center, Suite 150 LL, 90 West Chestnut Street, Washington, PA, 15301: Job Order No.: 6024106.

Multiple openings for Senior Software Engineers, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 1 year of experience using: 1 of A and 2 of B; or 1 of A and 1 of C. A) DB2, IMS DB; B) CICS, VSAM, IDMS, IMS DC, MVS/ESA; C) Telon, JCL, ADW. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: computer science, engineering, mathematics, chemistry, or physics. Will accept Bachelor's degree 5 years of progressive experience in the specialty as a computer professional in lieu of the Master's degree. $70,000/yr. 40 hours/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 2024183, to: Local Office Manager, Pittsburgh South job Center, 2100 Wharton Street, Pittsburgh, PA 15203.



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SAS Prog/Analysts to design, dev., code, implement, test, optimize, debug, validate data, & provide user support & documentation for database appls & systems, using SAS and various constituent tools, etc. on PC's & mainframes in Win 95, 98, and NT, TSO, & UNIX operating systems. Develop & customize GUI's using SAS Frames, SAS/BASE, SAS/SQL, SAS/SCL, SAS/MDDB, SAS/STAT, SAS/MACRO, SAS/GRAPH & SAS/EIS GUI development tools & Oracle tools. Populate multi-dimensional database using Base SAS & SQL Loader; test, install & configure c/s software for specified user access; network test'g & analysis; Job Control Lang. coding in TSO OS; transfer info. b/w Mainframe & NTserver. Sal @ $56,000/yr. + O/T; Req's Master's or Equiv. in Comp. Sci., Math, Statistics or Rel. Field; Knowl. of SAS as shown by compl. of coll. level courses in SAS or 1 yr's exp. working w/SAS. Travel may be req'd. Resumes to Jennifer Hansson, Aerotek, Inc., 7301 Parkway Dr. Hanover, MD 21076. Ref. No. LIN-99-75220.

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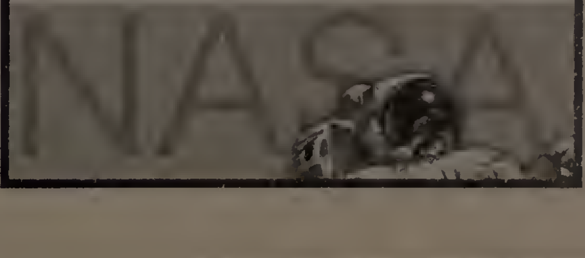

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Multiple openings for Software Engineers, who will develop software systems, applying computer science, engineering, and mathematical analysis, with 1 year of experience using: 1 of A and 2 of B; or 1 of A and 1 of C. A) DB2, IMS, DB; B) CICS, VSAM, IDMS, IMS DC, MVS/ESA; C) Telon, JCL, ADW. Analyzes software requirements and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: computer science, engineering, mathematics, chemistry, or physics. $60,000yr. 40hrs/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 5023930, to Mr. Ron Marsh, Manager, Alle-Kiski Job Center, 3 Kensington Square, New Kensington, PA 15068.

Multiple openings for Senior Software Engineers, who will develop software systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with some experience using C++ and Visual C++. Analyzes software requirements and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: engineering, mathematics, computer science, or physics. Will accept Bachelor's degree plus 5 years of experience as a computer professional in the specialty in lieu of the Master's degree. $70,000yr. 40 hrs/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 8048018, to Mr. Greg Schwing, Manager, Mon Valley Job Center, 345 Fifth Avenue, Mckeesport, PA 15132.

Multiple openings for Senior Software Engineers who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 1 year experience using SAP. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: computer science, engineering, mathematics, chemistry, biology, physics, or business. Will accept bachelor's degree plus at least 5 years of experience as a computer professional in lieu of the Master's degree. $100,000/yr. 40 hours/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 5023933, to: Mr. Tom Dembosky, Manager, Indiana Job Center, 350 N. Fourth Street, Indiana, PA 15701.

Multiple openings for Senior Software Engineers, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 1 year experience using: either C, C++, or Visual C++; and either Unix or Windows. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: engineering, mathematics, computer applications or physics. Will accept Bachelor's degree plus 5 years of progressive experience in the specialty in lieu of the Master's degree. $70,000/yr. 40 hours/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 2024180, to Washington Job Center, Manager, Millcraft Center, Suite 150 LL, 90 West Chestnut Street, Washington, PA 15301.

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SOFTWARE ENGINEER: Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Visual Basic 5.0, MS SOL Server, Crystal Reports and Visual C++. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Visual Basic 5.0, MS SOL Server, Crystal Reports and Visual C++. Salary: $75,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Duane M. Brentzel, Manager, Greensburg Job Center, 577 Sells Lane, Greensburg, PA 15601, Job No. 6024101.

Senior Software Engineer: Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Three years of experience required using Oracle database, UNIX, PL/ SQL and SQL Loader. Work involves extensive travel and frequent relocation. Must have three years of experience as a senior software engineer or as a computer professional and a Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics or scientific or business related field. Salary: $80,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. James Clarke, Mgr. Uniontown Job Center, 32 Iowa Street, Uniontown, PA 15401. Must reference Job Order No.: 9094407.

Software Engineer: Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have two years of experience as a software engineer or computer professional with 6 months of demonstrable experience using: Visual Basic, MS SOL, Crystal Reports, Windows NT, Windows 95, Unix, C, and SOL Server. Bachelor's degree or foreign equivalent in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics. Salary is $65,000 per/yr, 40 hrs/wk., 9-.00-5:00 p.m. Please submit resumes to: Mr. Ron Marsh, Mgr. Alle-Kiski Job Center, 3 Kensington Square, New Kensington, PA 15068, Job Order No. 8048224.

Data Base Administrator - Oracle database administration; data modeling; analysis, design, development and testing; and use Oracle Server, SQL*DBA and PL/SOL. Reqs. Master's in Computer Science, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering or Mathematics or its equiv. in edu. & exp. plus 3 yrs. exp. in job offered. Will accept a bachelor's degree or a foreign equiv. degree, followed by at least 5 yrs. of progressive exp. in the speciality, in lieu of the req. edu. & exp. 40 hrs/wk, 9a-5p, M-F, $70,000/yr. Send resumes to MJC/ESA, P.O. Box 11170, Detroit, MI 48211-1170. Ref. No. 146998. Employer Paid Ad.

Software Engineer: Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. One year in job offered or as a computer professional and one year of experience using: 1 of Group A and 3 of Group B OR 2 of A and 2 of B as follows: Group A - Oracle RDBMS, Designer 2000, Developer 2000, Oracle Applications (Financials, Manufacturing - Order Entry & Inventory); Group B - Oracle Forms, Oracle Reports, SQL*Plus, Pro*C, PL/SQL, SOL*Forms, SOL* Reports. Work involves extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics or scientific or business related field. Salary: $65,000 per/yr, 40 hrs/wk., 9:00-5;00 p,m. Please submit resumes to: Mr Tom Rusnack, Mgr. Charleroi Job Center, 10 Paluso Drive, PO Box 210, Charleroi, PA 15022. Reference Job Order No.: 7048266

Software Engineer (2 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation Work involves extensive travel arid frequent relocation. Must have one year of experience in job offered or as a computer professional and one year using: 1 of Group A and 1 of Group B and 1 of Group C; OR 2 of A and 1 of 13; OR 2 of A and 1 of C as follows: Group A DB2, IBM3090, IBM ES9000, MVS, IMS, IDMS; Group B CL/400, CICS, TSO, VSAM; Group C - Telon, COBOL, JCL, AS/400, RPG/400, COBOL/400. Bachelors degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics. Salary is $65,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to:Mr. Terry Kinney, Mgr., Armstrong County Job Center, 1270 N. Water St. PO Box 759, Kittanning, PA, 16201: Job Order No.: 8048347.

Senior Software Engineer (4 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation, Work involves extensive travel and frequent relocation. Must have one year of experience using: 1 of Group A and 1 of Group B and 1 of Group C, OR 1 of A and 2 of B; OR 1 of A and 2 of C as follows: Group A - Windows NT, Windows 95, Windows SDK, Windows API; Group B - Visual C++, Visual C, C, C++, Visual Basic, PowerBuilder, MFC, CGI; Group C - JAVA, TCP/IP, HTML. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics. Will accept B.S. degree with five years of experience as computer professional. Mary is $70,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. Duane M. Brentzel, Mgr., Greensburg Job Center, 599 Sells Lane, Greensburg, PA, 15601: Job Order No.: 7048272,

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Senior Software Engineer (3 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have 1 year in job offered or 1 year as a computer professional and one year of experience using: 1 of Group A and l of Group B and 1 of Group C; OR 2 of A and 1 of B; OR 2 of A and 1 of C as follows: Group A - DB2, IBM3090, IBM ES9000, MVS, IMS, ITEMS Group B CL/400, CICS, TSO, VSAM; Group C - TELON, COBOL, JCL, AS/400, RPG/400, COBOL/400. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics. Will accept B.S. degree with five years of experience as computer professional. Salary is $75,000 per/yr, 40 hrs/wk,, 9:00-5:00 p,m. Please submit resumes to: Mr. Tom Dembosky, Mgr., Indiana Job Center, 350 N. Fourth Street, Indiana, PA, 15701: Job Order No.: 7048271

Senior Software Engineer (2 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. One year of experience required using; 1 of Group A and 3 of Group B OR 2 of A and 2 of B as follows: Group A - Oracle RDBMS, Designer 2000, Developer 2000, Oracle Applications (Financials, Manufacturing - Order Entry & Inventory); Group 13 Oracle Forms, Oracle Reports, SOL*Plus, Pro*C, PL/SOL, SQL*Forms, SQL* Reports. Work involves extensive travel and frequent relocation. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem,, Math or Physics or scientific or business related field. Will accept B.S, degree or foreign equivalent with five years of experience as computer professional. Salary: $70,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to Washington Job Center Manager Millcraft Center Suite 150 LL, 90 West Chestnut Street, Washington, PA 15301. Reference: Job Order No.: 2024374

Senior Software Engineer (6 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. One year of experience required using; 1 of Group A and 3 of Group B OR 2 of A and 2 of B as follows: Group A - Oracle RDBMS, Designer 2000, Developer 2000, Oracle Applications (Financials, Manufacturing - Order Entry & Inventory); Group B Oracle Forms, Oracle Reports, SQL*Plus, Pro*C, PL/SOL, SOL*Forms, SOL* Reports. Work involves extensive travel and frequent relocation. Must have one year of experience as a senior software engineer or as a computer professional and a Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics or scientific or business related field. Will accept B.S. degree or foreign equivalent with five years of experience as computer professional. Salary: $75,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. Greg Schwing, Mgr., Mon Valley Job Center, 345 Fifth Ave., McKeesport, PA 15132: Job Order No.: 6024109

Multiple openings for Software Engineers, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, with 1 year of experience using: 1 ot A and 2 of B; or 2 of A; or 1 of A and 1 of B and 2 of C. A) Oracle, Ingres, Sybase, Access, Informix RDBMS. Case Tools; B) PL/SQL, SOL Plus, Reportwriter, Loader, Menu, Pro*C, DBA, Sequel Server, Server Manager, Powerbuilder, Forms and/or Reports (AKA Developer 2000.); C) Windows and Unix. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: computer science, engineering, mathematics, chemistry, business, economics, or in another field of science. $60,000/yr. 40 hrs/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 5023931, to Mr. Tom Rusnack, Manager, Charleroi Job Center, 10 Paluso Dr., PO Box 210, Cherleroi, PA 15022.

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We seek a committed, driven professional to manage, plan, develop and execute product verification and validation tests. You will also handle Product Build and Configuration Management, analyze and report on quality measurements for all OLAP Systems products, manage sustaining engineering product releases, and advocate quality issues throughout the development team.

The ideal professional must have at least 5 years of management experience (leading Quality Engineering teams) in the software product industry along with a thorough understanding of formal Quality Assurance methodology and process, automation, code coverage, and statistical analysis tools. Previous experience in a structured engineering environment and in the client/server or database product markets is essential as is a disciplined focus on quality and process improvement. The ability to inspire creativity in building quality into our products, maximizing test coverage and excellent communication, interpersonal, team-building and mentoring skills are also a must.

We offer competitive compensation and benefits including relocation, medical/dental, 401(k), plus career growth. For immediate consideration, please send your resume and salary requirements to: **Hyperion Solutions, Attn: HR-DQE, 900 Long Ridge Road, Stamford, CT 06902, Fax (203)968-2932. Email: sandi_lurie@hyperion.com.** EOE

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Manager of Computer Operations: Direct and coordinate activities of workers engaged in computer operations; adjusts hours of work, priorities, and staff assignments to ensure efficient operation, based on work load. Plans and develops policies and procedures for carrying out computer operations and meets with subordinates and vendors. Knowledge of software consultancy industry and Oracle RDBMS. Work involves extensive travel and frequent relocation. Must have at least one year of experience with 1 from Group A and 3 from Group B OR 2 from Group A and 2 from B: Group A: Oracle RDBMS, Designer 2000, Developer 2000, Oracle applications (i.e. Financials, Manufacturing, Order Entry, Inventory); Group B: Oracle Forms, Oracle Reports, SOL* Plus, Pro*C, PL/SQL, SQL* Forms, SOL*Reports, Master's degree in Computer Science/Applications, Engineering, Math, Physics or a scientific or business related field. Will accept a Bachelors degree plus 5 yrs. experience as a computer professional. Salary: $70,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. James Clarke, Mgr., Uniontown Job Center, 32 Iowa Street, Uniontown, PA 15401 Job Order No.: 6024170

SOFTWARE ENGINEER: Multiple openings for software engineer's to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Oracle Forms 4.5, Oracle7.3, Pro*C and PL/SQL. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Oracle Forms 4.5, Oracle7.3, Pro*C and PL/SOL. Salary: $57,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Richard Introcaso, Beaver County Job Center, 120 Merchant Street, Ambridge, PA 15003, Job No. 2024299.

Multiple openings for Senior Software Engineers, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 1 year of experience using either: 1 of A and 2 of B; or 2 of A; or 1 of A and 1 of B and 2 of C. A) Oracle RDBMS, Informix, DMS II, Case Tools; B) PL/SOL, SOL Plus, Reportwriter, Loader, Menu, Pro*C, DBA, Server Manager, Powerbuilder, Forms and/or Reports (AKA Developer 2000.); C) Windows, Unix. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: computer science, engineering, mathematics, chemistry or physic. Will accept Bachelor's degree plus 5 years of experience as a computer professional in the specialty. $70,000/yr. 40 hours/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 2024184, to: Mr. James Woods, Acting Manager, Pittsburgh East Job Center, 6206 Broad Street, Pittsburgh, PA 15206.

SOFTWARE ENGINEER: Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in RPG 400, DB2/400 and QUERY 400. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of RPG 400. DB2/400 and OUERY 400. Salary: $58,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. James Woods, Pittsburgh East Job Center. 6206 Broad Street. Pittsburgh, PA 15206, Job No. 7048138.

Multiple openings for Senior Software Engineers, or Computer Professionals, who will develop software systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 1 year of experience using: 1 of A and 2 of B; or 2 of A; or 1 of A and 1 of B and 2 of C. A) Oracle, Ingres, Sybase, Access, Informix RDBMS. Case Tools; B) PL/SOL, ESOL/C, SQL, SQL Plus, Reportwriter, Loader, Menu, Pro*C, DBA, Sequel Server, Server Manager, Powerbuilder, Forms and/or Reports (AKA Developer 2000.); C) Windows, Unix. Analyzes software requirements and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields; computer science, engineering, mathematics, chemistry, physics, business, economics, or in another field of science. Will accept Bachelor's degree plus 5 years experience as a computer professional in the specialty in lieu of the Master's degree. $70,000/yr. 40 hrs/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 8048019, to Mr. Richard Introcaso, Manager, Beaver County Job Center, 120 Merchant Street, Ambridge, PA 15003.

PROGRAMMER/ANALYST-From requirements develop specifications. Provide analysis. design, development, testing implementation & documentation of software utilizing CICS, DB2, Telon, PowerBuilder, Visual Basic, C & Structured Analytical Design & Development Methodologies. Req. 4 yrs exp in job or related EDP occupation. Exp in related occupation must include CICS. DB2, Telon, PowerBuilder, Visual Basic C & Structured Analytical Design & Development Methodologies $64,730/yr. 40hrs/wk. Mo-Fri. 8am-5pm. Job Site: Dallas, Texas. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701. J.O.#TX0610561 Ad paid by an Equal Opportunity Employer.

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- Experience in understanding IT's role in the overall success of the business

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- Five years of programming experience (preferably w/ at least two years ABAP)
- Three years SAP functional knowledge

Database Administrator (Memphis, TN)
- Three to five years of database exp. with either admin. or application programming
- One year of UNIX and Oracle experience

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- Eight years with design, development & maintenance of systems
- Four years in a leadership role. At least 2 years supervising employees
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Lead Systems Analyst (Chattanooga, TN)
- Four years supporting a manufacturing environment including experience with master scheduling, inventory control, and production planning
- We prefer candidates with (COBOL, IMS) mainframe experience; however any database experience (mainframe or relational) will be considered

Senior Systems Technician (Liberty Corner, NJ)
- Two years relational database experience
- Two to four years of Powerbuilder development and support
- A strong preference to version 6.0 or higher is desired, however, candidates that understand (OO) Object Orientation will be considered

Lead Developer/Analyst(Liberty Corner, NJ)
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5. AS/400: RPG/400, COBOL/400, DB2/400 SYNON or EDI is plus
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Consultant - SAP to meet & consult with clients to identify their needs & problems; visit client manufacturing plants to gather requirements, map requirements to SAP R/3; perform gap analysis & be involved in designing specifications for enhancements & modifications using ABAP; design & develop functional specifications for ABAP/4 coding requirements; identify planning strategies with respect to SAP as part of Business Process Reengineering (BPR); configure, customize & reports using ABAP/4 programming language & create layout sets using SAPScript; transfer data from legacy system into SAP R/3 system using BDC techniques; develop test steps for unit testing of USSC business process involving PP-module & test scenarios for integration testing; Reqs. Master's in Computer Engg., Manufacturing Engg/ Technology, Computer Information Systems, Computer Science, Electrical or Electronics Engineering or its foreign educational equiv. plus 3 mos. exp in job offered or 3 mos related exp such as SAP Consult. or Manufacturing Engr. Related exp must include designing & developing specifications for ABAP/4 coding; & creating layout sets using SAPScript; $63K, 40 hrs/wk, OT as reqd, 8a-5p. Submit resume or C.V. to The Phila. Job Bank, 444 N. 3rd St. - 3rd Fl., Phila., PA 19123. J.O. #8048122

Southern NH software firm seeks Software Engineer - Java /C++ Specialist: Using knowledge of C.S. & engineering: analyze user rqmnts. to determine software engineering rqmnts. & feasibility; using Java & C++ formulate, design, code & test computer software systems for apps. on UNIX & NT platforms; test, code & document software apps. Significant & frequent travel. Req'd: M.S. in C.S. or Electrical Engineering (or equiv.), 2 yrs. exper. in software engineering. F/T, M-F, $66,000/ yr. Two (2) resumes to Job Order #99-131, PO Box 989, Concord, NH 03302-0989.

Systems Analyst, Philadelphia, PA; Analyze, design and develop Client Server applications in PowerBuilder using class libraries and Visual Basic using Oracle and Sybase as RDBMS on Windows, DOS and Unix Operating Systems. Req'd. Bachelors in Engineering or Comp.Scie. or Math. 2 years experience in job offered. 40 hrs/wk., 9a-6p. $85,000/year. Submit resumes or C.V. to The Phila. Job Bank, 444 N. 3rd St- 3rd Fl. Phila., PA 19123. Job Order #7048042.

SOFTWARE ENGINEER to design, develop, test, implement and maintain software for various financial management applications using RPG/400, RPGLE, OS/400, OS/390, CL/400, QUERY/400, DBU/400 ALDON, HAWKEYE, COBOL, TSO and IMS on IBM AS/400 and IBM 390 machines. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field, with 2 years of experience in the job offered; Extensive paid travel on assignments to various client sites within the U.S. is required. Salary: $65,000 per year, 8:00 am to 5:00 pm, M - F. Apply by resume to: Raghavendra Kulkarni, President, Pro Softnet Corporation, 3235 Satellite Blvd., Bldg. 400, Suite 300, Duluth, GA 30096, Attn: Job HS

Network Engineer: Durham (NC); Design, implementation and operational support of computer networks and electronic mail systems in local area and wide area environments using microsoft mail and microsoft exchange messaging systems techniques. Required B.S. degree in Electrical/Communication Engg. and two years experience in the position offered or in a related occupation of network and email engineer or network and email systems analyst. Salary $65,000 yr; Mon thru Fri 8.00 am-5.00 pm/40 hrs week; Please send resume with applicant's social security number and job order number #NC3007622 and DOT code 030.062-010 to: Job Service, 1105 Briggs Avenue, Durham, NC 27703 or apply to the nearest job service office.

Senior Quality Assurance Analyst to oversee IEEE/ ANSI compliance using: OA Partner, SQA Robot, and Win-Runner wanted by Systems & Prgmg Consultation Co. in Tarrytown, NY. Must have MS in Comp Sci and 3yrs exp as qlty assurance engr/systems analyst or comp prgmr (Bachelors + 5 yrs exp also accepted). Respond to: HR Dept. DCM Consulting, 303 S. Broadway, Ste 475, Tarrytown, NY 10591.

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support software systems for various applications using object oriented techniques, C, C++, Visual C++, Rogue Wave tools.h++, Oracle, CMVC, Shell Scripts, make, purify, dbxtra and TCP/IP sockets on UNIX platforms. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field with 1 year of experience in the job offered; Extensive paid travel on assignments to various client sites within the U.S. is required. Salary: $65,000 per year, 8:30 am to 5:30 pm, M-F. Apply by resume to: Roz L. Alford, CEO, A.S.A.P., Inc., 3495 Buford Hwy., Duluth, GA 30097; Attn: Job SA

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support application software systems using C/C++, Visual Basic, Envy, Smalltalk, COBRA, VisualAge, Oracle, Versant, UML, Fusion and Rational Rose under Windows 95/98/NT and UNIX operating systems. Require: M.S. degree in Computer Science, Computer Information Systems, or a closely related field, with two years of experience in the job offered; Extensive travel on assignment to various company and client sites within the U.S. is required, Salary: $60,000/yr; M-F 8:30 a.m. to 5; 15 p.m. Send resume to: Elizabeth Haney, Asst. V.P., P.M.S.C., 1 P.M.S.C. Center (Int. Of 1-77 & US 21 N), Blythewood, SC 29016; Attn: Job SA.

Southern NH software firm seeks Software Engineer - Oracle/DBMS Specialist: Using knowledge of C.S. & engineering: analyze user rqmnts. to determine database proj. initiatives & feasibility; using Oracle development tools & Oracle database, formulate, design & code full functionality databases; devel. & direct testing, programming & documentation of database appls. Significant & frequent travel. Req'd: M.S. (or equiv.) in C.S. or Electrical Engineering, 2 yrs. exper in software engineering, demo'd knowledge of & exper. w/Oracle development tools & Oracle database. F/T, M-F, $66,000/yr. Two (2) resumes to Job Order #99-130, PO Box 989, Concord, NH 03302-0989.

SENIOR TECHNICAL SYSTEMS ENGINEER. 40 hrs. per week. 8 am-5 pm. $70,000 per year. Located in Jacksonville, FL. Requires: A Bachelor or Foreign Degree equivalent in Business Administration or Computer Science and 6 years experience in the job offered or 6 years related experience as an Application Developer. Design, develop and support very large scale enterprise JAVA based system; systems will support delivery channel access across a broad range of products and services. Send resume to Dept. of Labor/Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302, ATTN: L. Knight, RE: JOFL #1930678.

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ENGINEERING MANAGER to manage the growth and operation of data communications network, including strategic planning design, procurement, implementation, performance monitoring and tuning of network systems; Provide project management on data communications projects; Direct operational efforts of network analysts in implementing customer requirements; Develop policies and procedures governing networking activities; Evaluate requests for data communication enhancements and alterations; Recommend solutions and provide timetables for completion; Manage and coordinate installation of all data communication hardware/software components; Utilize knowledge of networking and data communications standards and protocols such as RS232, TCP/IP, X.25, FDDI, ETHERNET, ATM, ISDN and emerging communications technologies; Utilize experience with various data communications media such as twisted pair and fiber optics, as well as with network hardware, file servers, operating systems, end-user devices and LAN/WAN electronics. Require; Bachelor's degree (or equivalent) in Computer Science, Computer Information Systems, Business Administration, or a closely related field, with 2 years experience in the job offered; Three years of college education with an additional three years of experience in the field will be considered equivalent to a Bachelor's degree. Salary: $60,000 per year, 8:30 am to 5:30 pm, M-F. Apply by resume to: Nazir Molu, President, Classic Computer Systems, 4355 International Blvd., Norcross, GA 30093; Attn: Job AM

Software Engineer. (Multiple openings). (Secaucus, NJ). Requires a Master's degree in Computer Science, Electronics & Communications Engineering or Electrical Engineering. Also requires 2 yrs' exp. in the job offered or in the use of APT, SQR & CTI (computer telephone interface) in support of global financial sales force automation via the Internet. In lieu of Master's degree, will accept a Bachelor's degree in stated field & five additional years of progressive exp. with APT, SQR and CTI. Engineer vital computerized marketing & sales applications using APT, SQR and CTI in support of global financial sales force automation to provide external & internal wholesalers Internet access to key mrktg. information, incl. client profiles, & prospect information. Re-engineer mrktg. & sales tracking systems to provide browser front-end access Internet/Intranet environ. Establish standards & processes in connection with Intranet/Internet technologies. Integrate sophisticated advancements & developments into existing Dealer Marketing Sales Tracking Systems & perform object-oriented analysis & design in support of this project. Migrate reports from Sybase SQR to Crystal Infoserver. Provide dealer mrktg. call tracking & call assignment features utilizing CTI. Dev. & implement new sales force information tool COSMOS for int'l wholesaler sales force to provide client/prospect & daily sales info. of retail funds and joint venture sales activities. Apply with resume to: Human Resources, Alliance Capital Management L.P., 500 Plaza Drive, Secaucus, NJ 07094.

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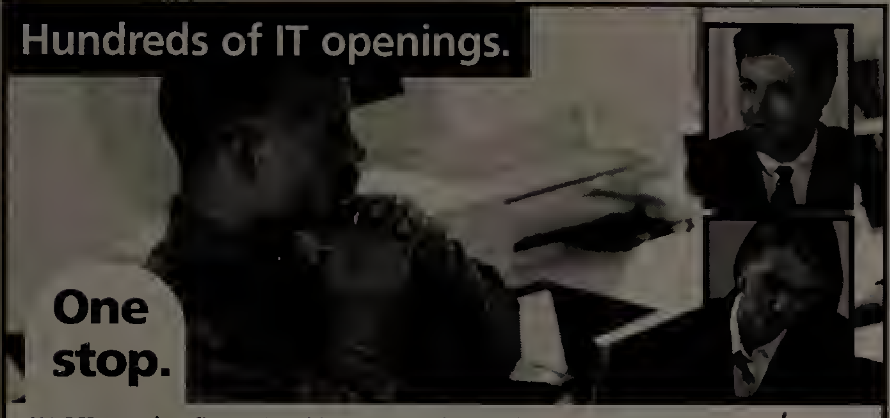
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Software Applications Developers (RD20)

Develop, install and configure software for network management applications for digital access products. Requires Java and C/C++ languages, X-Based GUIs, and structured development methodologies in UNIX or Windows environments.

Software Developers (RD21)

Design/implement software sub-systems for network access products. Embedded processor development, hardware drivers, DDS, T1, E1, ISDN, DSL, WANs, TCP/IP, PPP, SLIP, LAP-B, Telnet, routing protocols, Frame Relay, ATM, and SNMP. Work in UNIX (Solaris and SunOS) development environment, Motorola 68xxx processors and/or Real time OS. Requires knowledge of C/C++.

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System testing complex data networking and switching products. Skills in the use of a testing methodology for test case creation and execution. Knowledge of TCP/IP, FTP, TFTP, Ethernet, Frame Relay, ATM and SNMP; router set-up and configuration.

Hardware Developers (RD23)

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EDA Engineers (RD24)

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Programmer/Analyst wanted by Advanced Software Research & Dvlpmt Co. in Concord, MA. Must have MS in Engg; 2 yrs exp in s/ware dsgn & dvlpmt under WIN NT, UNIX, OS/2 using C/C++ & RDBMS. Respond by resume to: HR Dept, Crystaliz, Inc, 9 Pond Lane, 4D, Concord, MA 01742.

Datawarehousing Architect needed by Computer Consulting Co. in Lawrenceville to work at client sites in NY & NJ. Must have Master or equiv in Comp. Sc, Engg, Economics or Statistics and 4 yrs exp in job or 4 yrs as Prgmr Analyst, Systms Administrator or Database Administrator. Respond to: HR Dept, Atlanta Technologies & Systems, Inc, 3371 US Rte 1, Ste 218, Lawrenceville, NJ 08648.

Software Engineer wanted F/T by S/ware Dvlpmt & N/work Integration Co. in Metuchen, NJ. Must have Masters or equiv in Comp Sci, Comp Engg, Electronics or Electrical Engg and 1 yr exp in n/work administration. Respond by resume to: HR Dept., Netcom Systems Inc, 61 Pearl St, Metuchen, NJ 08840.

Programmer/Analyst needed F/T by Comp Services Co. in Edison, NJ. Must have 1 yr exp planning, dvlpg, testing & documenting comp prgms using VB, HTML and JAVA w/INFORMIX and SYBASE d/base systms in UNIX envrmt. Bach in Comp Sci, Comp Engg or Elec Engg req'd. Respond by resume to: HR Dept, Horizon Companies, Inc, 5 Lincoln Hwy, Edison, NJ 08820.

Programmer/Analyst needed by Computer Services Co. in Colts Neck for job location in Middletown, NJ. Must have 1 yr exp planning, dvlpg, testing & documenting comp. s/ware incl Y2K solutions using C/C++ w/ORACLE in UNIX envrmt, Visual C++ w/ORACLE/SQL Server in Win envrmt & dvlpmt of internet/intranet applics using perl, HTML, JAVA & ASP/MS Site Server. Bach. in Comp Sci, Comp Engg or Elect Engg req'd. Respond by resume to: HR Dept., Communications Excellence, Inc, 11 Deputy Minister Drive, Colts Neck, NJ 07722.

Programmer Positions Available: Multiple Develop software for Windows 3.1 and Windows 95/NT platforms. Install applications at client sites. Perform software testing and application support. Teach programming languages to other employees. Must have at least an MS degree in Computer Science or related field & six mos. exp. or six mos. exp. as a Programmer or Systems Analyst or related w/ability to use: C, C++, SQL, PAL, Assembly, Basic, Fortran, Pascal, Visual Basic, Java, HTML, and Cobol. 40.0 hr/wk. $48,000/yr. 9:00-5:00. Applicants send resume to: Human Resources Director, 9550 Regency Square Blvd. Ste. 1000, Jacksonville, FL 32225

Systems Analyst wanted F/T by Comp Services Co. in Manh. Must have 2 yrs exp in analysis dsgn & dvlpmt of comp systms which integrate the web browser as a front end w/groupware systms using Lotus Notes/Domino, relational d/bases & internet technologies. Bachelors in Comp Sci, Comp Engg or Elec. Engg req'd. Respond to: HR Dept, Cadenza, Inc, 90 Park Ave, New York, NY 10016.

Systems Analyst-Charleston, WV-Analyze reqs, perform logical & physical design for client/server architecture on UNIX based platforms. Use ORACLE, PowerBuilder & COBOL. Req: Bach. in Comp. Sci., Math/Accounting or Engr & 2 yrs exp. M-F, 8AM-5PM, 40 hrs/wk, $55,000/yr. Report to/or send resume for referral to: Charleston Job Service, 1321 Plaza East, PO Box 1349, Charleston, WV 25325-1349, Phone (304) 558-0342 JO#WV1170476

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Programmer Analyst: Duties are to analyze, dsgn, dvlp & implmnt s/ware applics in accordance w/client specs, modify &/or enhance systms capabilities by using various comp langs & skills such as ORACLE, Visual Basic, MS-Access on UNIX & Windows Envirmnt. Must have M.S. in Comp Sci. Salary range $45K to $65K/yr + Med. Benefit. Send resume to: Vice President, Koni Ameri Tech Services, Inc., 5950 Live Oak Pkwy, Ste # 250, Norcross, GA 30093.

SOFTWARE DEVELOPER: Design and develop of applications for professional services engagements using COBOL, S-COBOL, C, and Developer 2000. Design and develop network system software including API applications. Requires: B.S. in Computer Science, Math, Physics, or related field plus 5 years experience in software development. Must have demonstrated knowledge of UNIX, Tandem, Windows and Windows NT operating systems and of large transaction systems, systems software and peer-to-peer connectivity software. 40 hrs/wk (9:00 a.m. to 5:00 p.m.); $66,040/yr. Send two (2) resumes/respond to: Job Order #99-111, PO Box 989, Concord, NH 03302-0989.

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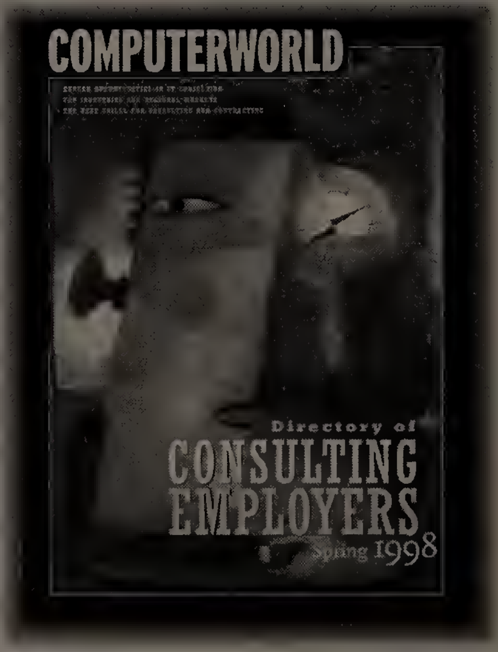

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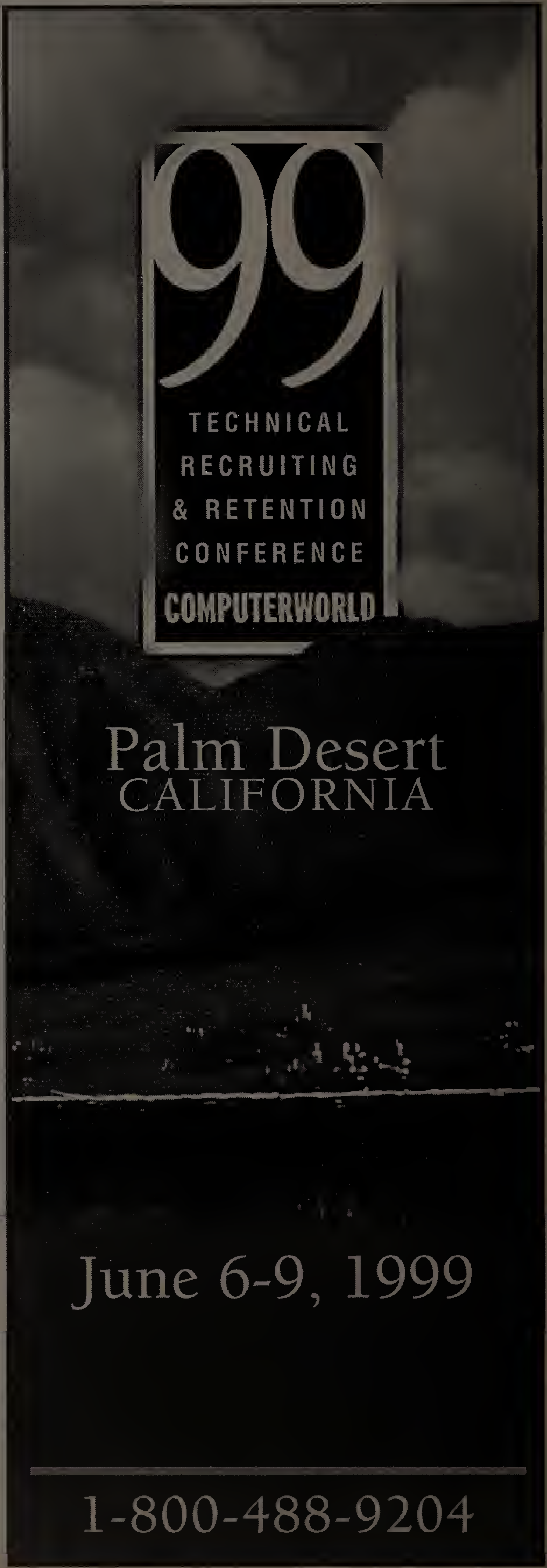
Programmer Analysts: Duties incl to analyze, dsgn, dvlp & implmnt s/ware applics in accordance w/client specs, modify &/or enhance systms capabilities by using various comp langs & skills such as C, C++, ORACLE on UNIX & Windows Envirmnt. Must have M.S. in Comp Sci. Salary range $45K to $65K/yr + Med. Benefit. Send resume to: President, Softech Int'l Resources, Inc., 12th Fl, E. Tower Center Square, 1500 Market St, Phila, PA 19102.



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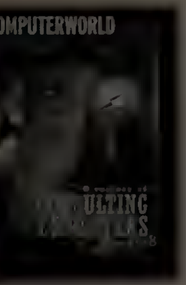

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Multiple openings for Senior Software Engineers who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 1 year experience using Unix and networking products. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: computer science, engineering, mathematics, or physics. Will accept Bachelor's degree plus 5 years experience in the specialty as a computer professional in lieu of the master's degree. $70,000/yr. 40 hours/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 7047915, to Mr. Terry Kinney, Manager, Armstrong County Job Center, 1270 N. Water St., PO Box 759, Kittaning, PA 16201.

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Senior Software Engineers (3 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation, Must have one year of experience in job offered or as a computer professional and one year using SAP. Masters degree in Computer Science/Applications, Engineering, Chemistry, Math, Physics or a business related field. Will accept B.S. degree with five years of experience as computer professional. Salary is $105,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. Terry Kinney Mgr., Armstrong County Job Center, 1270 N. Water Street, PO Box 759, Kittanning PA 16201: Job Order No.: 8048231.

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Respond by resume to HR Dept, Jay R. Smith Mfg, 2781 Gunter Park Drive, East, Montgomery, AL 36109-140S. Fax 334-213-874S.

Programmer Analyst (5 Openings) (JON 7048030) Plan, develop, test, and document computer programs, evaluate user requests for new and modified programs; and use JCL, DB2, and VSAM. Reqs. a Bachelor's Deg. (or its foreign educational equiv.) in Comp. Sci., Sys. Anal., CIS., Comp. Eng., Elect'l Eng., Electo. Eng., Electronics and Communication or Math and 6 mths. exp. in the job offered. $60,000.00/year. 40 hours, 9-5, M-F Send resume along with JON 7048030 to Philadelphia Job Bank, 444 North 3rd Street 3rd Floor, Philadelphia, PA 19123

Multiple openings for Software engineers with 1 year experience as s/w engineers or computer professionals, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, with 1 year of experience using SAP Analyzes s/w reqs and performs testing and user training after development Extensive travel and frequent relocation Bachelor's degree in one of several limited fields: engineering, mathematics computer science, biology, chemistry or physics. $80,000/yr 40 hours/wk , 9:00 am - 5:00 pm Send resumes, listing job order number 9094200, to Ms Joan Lang, Manager Pittsburgh West Job Center, 320 B[illegible]mar Dr[illegible] Pittsburgh, PA 15205

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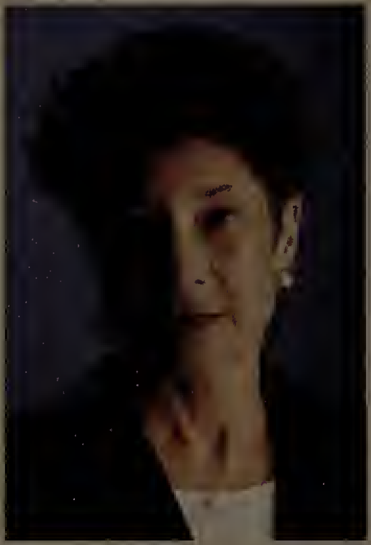

Fran Quittel

Nationally Recognized Career Expert and Computerworld's CareerAdvisor Columnist

With a lengthy background in high tech careers and recruiting, Computerworld's CareerAdvisor Fran Quittel specializes in providing in-depth information for job seekers and a "Recruiting Scoreboard" to help employers audit and improve their internal recruiting practices. Fran is author of the book *Firepower: Everything you need to know before and after you lose your job* and is the original creator of The FirePower Career Forum on The Microsoft Network. She also publishes career advice at www.careerbabe.com and tips for employers at www.yourcareer.com

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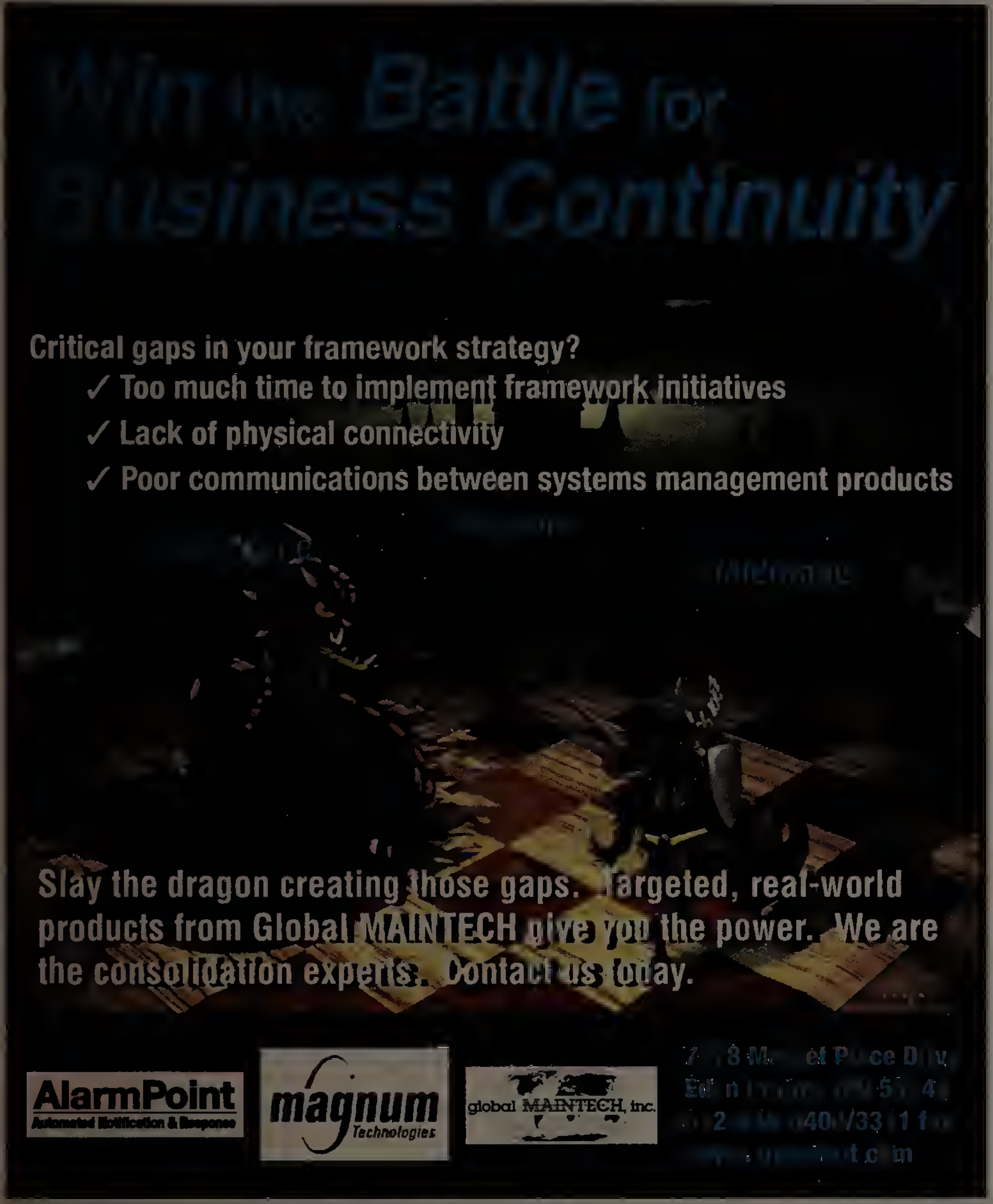

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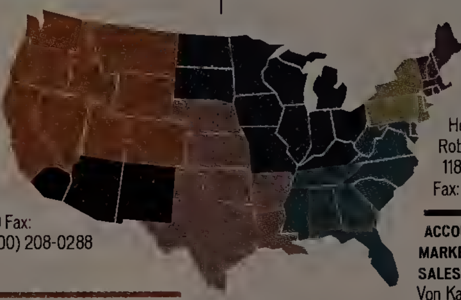

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WEEK IN STOCKS

GAINERS

PERCENT	
Platinum Technology Inc.	164.9
Tech Data	39.4
Cambridge Technology Ptnrs (L)	37.1
Verilink (L)	35.9
Sapient Corp.	25.1
Open Text Corp. (H)	23.6
Renaissance Worldwide	22.0
Amazon.com	21.9

DOLLAR	
Amazon.com	30.19
Qualcomm (H)	22.19
America Online (H)	19.81
Platinum Technology Inc.	15.88
Sapient Corp.	14.38
Uniphase (H)	12.50
Lexmark Int'l Group, Nc. (H)	10.19
Nokia Corp. (H)	9.06

LOSERS

PERCENT	
Secure Computing Corp.	-45.9
Documentum (L)	-40.3
Panamsat	-24.7
Avid Technology	-23.6
Wind River Systems Inc.	-15.7
J.D. Edwards & Co. (L)	-15.0
PeopleSoft Inc. (L)	-11.7
Keane (L)	-11.6

DOLLAR	
Panamsat	-9.94
Documentum (L)	-6.88
Infoseek	-5.63
Avid Technology	-5.44
Excite, Inc. (H)	-5.25
Computer Sciences	-5.13
Secure Computing Corp.	-4.94
AT&T	-4.13

INVESTORS STILL LOVE NET IPOs

But longer term, analysts predict bumps in road

BY DAVID RAMEL

INDUSTRY ALMANAC

Investor enthusiasm for Internet-related initial public offerings (IPO) is continuing unabated, even as analysts warn the good times won't last.

The latest Net darlings include Priceline.com (Nasdaq: PCLN), which opened at an offering price of $16 last Tuesday and closed Wednesday at $82.88; Miningco.com Inc. (Nasdaq:MINE), which on March 24 opened at $25 and closed last Wednesday at $89.50; and iVillage Inc. (Nasdaq:IVIL), which on March 19 opened at $24 and closed Wednesday at $100.50.

Far from slowing down, the Internet IPO market "is really building up speed," said Ken Fleming, an analyst at Renaissance Capital Corp. in Greenwich, Conn. (*www.ipo-fund.com*). He pointed out that last year there were 28 Internet-related IPOs total, but at least 30 will have been completed in the first four months of this year.

And their performance is leading the bull market. In Renaissance's list of "Hot IPOs," of the 25 companies that have gone public since early last year and are now trading at more than 200% above their offer prices, the top 11 are Internet-related.

Fleming said the increasing number of Internet IPOs will lead to more companies that won't meet the financial performance numbers that investors have come to expect.

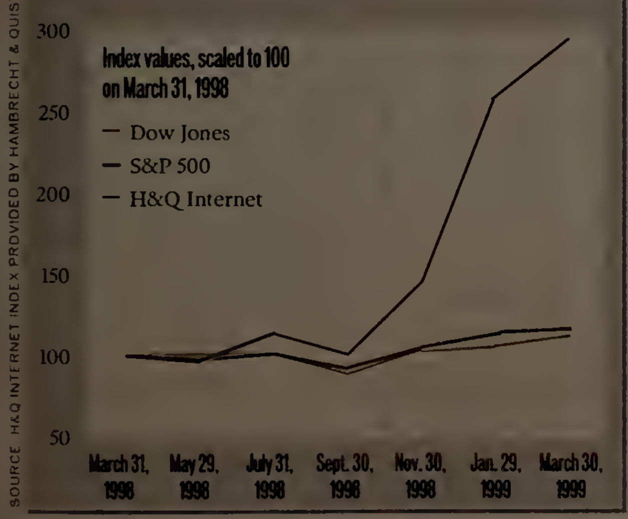
"Everything has been going up, [but] longer-term it's going to be pretty risky because valuations are assuming that these companies are going to live up to very high expectations," he said.

David Menlow, president of IPO Financial Network (*www.ipofinancial.com*) in Millborn, N.J., is more direct. "At some point, the Internet market is just going to get whacked," he said.

But first, "It's going to slow down because of the inability to consistently bring new Internet themes to market. We're going to start to see filings that look like clones of existing successful platforms, and that will cause a lot of problems for the market," Menlow said. ▶

Internet Stocks Boom

Comparing the growth of the H&Q Internet Index with the Dow Jones Industrial Average and the S&P 500



SOURCE: H&Q INTERNET INDEX PROVIDED BY HAMBRECHT & QUIST LLC

SOFTWARE UP 0.7%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
ADBE	59.81	23.62	Adobe Systems Inc. (H)	56.25	-0.50	-0.9
AZPN	56.87	6.12	Aspen Technology Inc.	13.00	1.56	13.7
ADSK	49.43	21.62	Autodesk Inc.	37.94	-2.56	-6.3
AVID	47.75	11.06	Avid Technology	17.56	-5.44	-23.6
BOOL	34.87	16.00	Boole & Babbage Inc.	24.00	-0.38	-1.5
BOBJ	42.50	6.12	Businesss Objects S.A	29.25	-1.88	-6.0
CDN	39.00	19.12	Cadence Design Systems	25.69	-0.88	-3.3
CBTSY	63.87	6.68	CBT Group Plc.	12.00	-1.25	-9.4
CHKPF	56.00	10.87	Checkpoint Software Tech Ltd.	39.63	-0.38	-0.9
CTXS	53.75	23.12	Citrix Systems Inc.	37.25	0.22	0.6
COGNF	30.50	14.75	Cognos Inc.	23.94	3.63	17.8
CA	61.93	26.00	Computer Associates Int'l Inc	34.94	0.88	2.6
CPWR	40.00	17.93	Compuware Corp.	24.31	0.38	1.6
DCTM	59.62	10.19	Documentum (L)	10.19	-6.88	-40.3
EFII	42.62	13.50	Electronics For Imaging (H)	41.13	0.81	2.0
HNCS	47.12	22.50	Hnc Software	35.25	5.25	17.5
IOXC	55.75	13.75	IOX Systems	14.50	-1.03	-6.6
IFMX	14.00	3.50	Informix Software Inc.	7.31	-0.84	-10.3
INTU	105.68	34.18	Intuit (H)	103.13	7.13	7.4
JKHY	55.00	29.00	Jack Henry Associates	35.81	0.75	2.1
JDEC	49.50	11.87	J.D. Edwards & Co. (L)	12.00	-2.13	-15.0
LGTO	67.75	23.50	Legato Systems Inc.	47.88	-3.13	-8.1
MACR	46.06	12.31	Macromedia Inc. (H)	44.06	1.06	2.5
MANU	66.37	6.12	Manugistics Group Inc.	6.56	-0.31	-4.5
MENT	15.06	5.43	Mentor Graphics	12.94	0.25	2.0
MSFT	94.62	40.93	Microsoft Corp. (L)	91.50	2.53	2.8
NETA	67.68	25.50	Network Associates	30.13	-3.38	-10.1
GMH	57.87	30.37	Network General	49.88	-2.00	-3.9
NOVL	28.12	9.18	Novell Inc.	25.25	-0.31	-1.2
ORCL	41.18	12.25	Oracle Corp.	25.94	-1.63	-5.9
PMTC	36.31	8.50	Parametric Technology Corp	19.63	-0.13	-0.6
PSFT	57.43	14.00	PeopleSoft Inc. (L)	14.13	-1.88	-11.7
PIXR	66.00	27.50	Pixar	38.50	-1.56	-3.9
PLAT	34.31	9.00	Platinum Technology Inc.	25.50	15.88	164.9
RATL	35.62	10.50	Rational Software Corp.	27.63	1.25	4.7
SAP	60.12	23.75	SAP AG	25.75	0.06	0.2
SCUR	29.00	5.81	Secure Computing Corp	5.81	-4.94	-45.9
SE	48.75	20.12	Sterling Commerce Inc.	30.50	0.38	1.2
SSW	32.81	20.12	Sterling Software Inc	23.44	1.81	8.4
SDRC	29.00	7.50	Structural Dynamics Research	18.63	-0.13	-0.7
SYBS	11.62	4.50	Sybase Inc.	7.31	0.75	11.4
SYMC	32.62	8.68	Symantec Corp.	16.44	0.13	0.8
SNPS	61.25	24.50	Synopsis	52.88	2.50	5.0
SCTC	30.87	7.81	Systems & Computer Technology	9.44	0.19	2.0
BAANF	55.50	6.87	The Baan Co. N.V.	8.41	-0.41	-4.6
VNTV	39.75	5.00	The Vantive Corp.	12.00	0.13	1.1
TSAI	51.00	27.06	Trans. Sys. Arch.	34.50	-1.50	-4.2
VRTS	89.50	23.75	Veritas Software Corp.	82.44	2.63	3.3
WIND	34.43	16.44	Wind River Systems Inc.	16.44	-3.06	-15.7

TELECOMMUNICATIONS CARRIERS OFF -0.1%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
ATI	98.87	42.25	Airtouch Communications	95.25	7.44	8.5
AT	67.50	38.25	Alltel Corp.	62.94	-2.63	-4.0
AIT	69.37	41.50	Ameritech Corp.	59.69	-0.88	-1.4
ANDW	24.37	10.37	Andrew Corp.	12.69	1.31	11.5
T	96.12	48.37	AT&T	78.88	-4.13	-5.0
BCE	46.75	25.62	BCE, Inc. (H)	45.38	-0.69	-1.5
BEL	61.18	40.43	Bell Atlantic	51.44	-0.38	-0.7
BLS	50.00	30.50	Bell South	40.94	0.19	0.5
CSN	23.43	8.50	Cincinnati Bell Inc.	22.25	-0.69	-3.0
CMCSK	78.43	32.62	Comcast	63.50	-1.88	-2.9
CQ	42.75	21.75	Comsat Corp.	28.81	-0.88	-2.9
COX	82.56	41.18	Cox Communications Inc.	75.06	-0.88	-1.2
GSTRF	36.12	8.31	Globalstar Telecom. Ltd.	14.25	-0.75	-5.0
GTE	71.81	46.56	GTE Corp	60.25	1.56	2.7
NXTL	40.00	15.37	Nextel Communications (H)	38.94	2.19	6.0
SPOT	66.12	26.50	Panamsat	30.25	-9.94	-24.7
QCOM	136.38	37.75	Qualcomm (H)	136.38	22.19	19.4
SBC	59.93	35.00	SBC Communications	49.13	1.38	2.9
FON	100.68	54.43	Sprint Corp.	99.75	1.00	1.0
TDS	58.00	30.62	Telephone and Data Systems	56.13	-1.25	-2.2
USW	66.00	46.81	US West	55.13	-0.31	-0.6
VIA	45.50	24.62	Viacom (L)	42.31	-0.44	-1.0
WCII	48.12	10.25	Winstar Communications Inc.	36.81	1.31	3.7
WCOM	94.25	39.00	MCI Worldcom Inc	88.75	-1.38	-1.5

SERVICES UP 3.5%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
ACXM	31.25	16.50	Acxiom Corp	25.38	0.00	0.0
ACS	51.75	22.37	Affiliated Computer Servs	44.69	3.19	7.7
AMSY	40.25	19.25	American Mgt. Systems	33.94	1.06	-3.0
AUD	42.62	30.81	Automatic Data Processing	41.13	2.38	6.1
BSYS	59.37	34.06	Bisys Group, Inc.	55.69	-0.25	-0.4
CATP	58.37	10.62	Cambridge Technology Ptnrs (L)	15.00	4.06	37.1
CEN	40.50	24.00	Ceridian	37.00	1.31	3.7
CBR	40.87	13.31	Ciber Inc.	19.44	0.19	1.0
CDO	23.25	10.75	Comdisco	17.50	-0.13	-0.7
CHRZ	52.75	10.06	Computer Horizons Corp	10.50	-0.88	-7.7
CSC	74.87	46.25	Computer Sciences	52.81	-5.13	-8.8
DST	70.56	34.00	Dst Systems Inc.	58.69	1.81	3.2
EDS	54.00	30.43	Electronic Data Systems	48.63	-0.75	-1.5
FDC	44.50	19.68	First Data Group	42.38	-0.06	-0.1
FISV	56.37	36.75	Fiserv	53.88	0.38	0.7
IT	38.00	17.31	Gartner Group	22.75	0.75	3.4
KEA	60.93	20.00	Keane (L)	20.00	-2.63	-11.6
NDC	55.25	26.18	National Data	41.06	3.06	6.9
PAYX	55.06	33.12	Paychex, Inc	47.88	0.75	1.6
REGI	28.93	4.00	Renaissance Worldwide	6.41	1.16	22.0
REY	24.00	12.62	Reynolds & Reynolds	18.63	0.38	2.1
SFE	74.00	17.12	Safegard Scientifics	67.25	1.19	1.8
SAPE	82.87	24.25	Sapient Corp	71.75	14.38	25.1
SMS	86.50	40.06	Shared Medical Systems	57.31	-1.50	-2.6
SDS	41.93	21.68	Sungard Data Systems	38.88	-1.94	-4.7
SYNT	32.62	8.68	Syntel Inc	16.44	0.13	0.8
TECD	53.12	14.50	Tech Data	23.31	6.59	39.4
TSS	26.25	14.43	Total System Services, Inc	18.75	-0.25	1.3
TSAI	51.00	27.06	Transaction Sys. Architects	34.50	-1.50	4.2

NETWORK UP 2.9%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
COMS	51.12	22.93	3Com Corp	22.94	-0.56	2.4
ADCT	51.37	15.75	ADC Telecommunications Inc (H)	49.50	2.63	5.6
ANTC	29.68	11.50	Antec (H)	24.69	-2.69	9.8
ASND	93.37	32.62	Ascend Communications Inc	86.19	6.44	8.1
BNYN	19.37	2.12	Banyan Systems Inc	13.81	2.19	18.8
CS	15.31	6.62	Cabletron Systems	8.13	0.75	8.5
CNEBF	20.00	5.75	Call-Net Enterprises	8.69	0.56	-6.1
CSCO	117.50	41.12	Cisco Systems Inc.	109.56	3.69	3.5
ECILF	45.00	19.75	ECI Telecom	36.25	3.50	10.7
FORE	28.00	9.25	Fore Systems Inc.	19.75	1.56	8.6
HRS	53.00	27.56	Harris Corp	28.00	2.69	-8.8
GMH	57.87	30.37	Hughes Electronics/GM	49.88	2.00	-3.9
ERICY	34.00	15.00	LM Ericsson	24.81	0.88	3.7
LU	120.00	53.43	Lucent Technologies	110.31	8.00	7.8
MADGF	7.75	1.75	Madge Networks	2.56	-0.13	-4.7
NCDI	11.50	4.37	Network Computing Dev	5.00	-0.31	-5.9
NWK	20.62	7.87	Network Equipment Tech.	8.75	-0.25	2.8
NN	39.87	15.43	Newbridge Networks	32.50	4.06	14.3
NOK A	162.06	53.37	Nokia Corp. (H)	159.00	9.06	6.0

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
NT	69.25	26.81	Northern Telecom Ltd	62.88	0.81	1.3
PAIR	24.37	6.00	Pairgain Technologies Inc	9.58	0.66	7.4
PCTL	11.93	4.75	Picturetel	7.06	0.25	3.7
SFA	35.00	11.75	Scientific Atlanta	26.69	-1.13	-4.0
TLAB	101.12	31.37	Tellabs Inc. (H)	99.25	1.44	1.5
USW	66.00	46.81	US West	55.13	0.31	0.6
VRLK	11.12	2.12	Verilink (L)	3.31	0.88	35.9
WSTL	13.87	2.75	Westell Technology Inc	4.13	0.08	1.5
XYLN	36.87	9.62	Xylan (H)	36.75	0.08	0.2

SEMICONDUCTORS, CHIPS & EQUIPMENT UP 3.5%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
ADPT	26.75	7.87	Adaptec	23.94	0.31	1.3
AMD	33.00	9.31	Advanced Micro Devices	15.56	-0.69	-4.2
ALTR	71.87	28.25	Altera	62.50	1.38	2.2
ADI	39.62	12.00	Analog Devices	31.63	2.13	7.2
AMAT	71.62	21.56	Applied Materials	63.63	5.44	9.3
ASML	49.06	12.93	ASM Lithography Holding	46.13	3.25	7.6
HRS	53.00	27.56	Harris Corp.	28.00	-2.69	-8.8
INTC	143.68	65.65	Intel Corp.	120.50	2.00	1.7
KLAC	65.00	20.75	Kla Instruments	49.31	-0.19	-0.4
LLTC	55.00	19.56	Linear Technology (H)	54.44	3.38	6.6
LSI	32.00	10.50	LSI Logic (H)	31.63	3.63	12.9
MXIM	56.62	22.31	Maxim Integrated Products	54.81	4.25	8.4
MU	80.56	20.06	Micron Technology	48.81	0.38	0.8
MOT	77.37	38.37	Motorola (H	73.75	-2.25	-3.0
NSM	24.75	7.43	National Semiconductor	9.13	-0.75	-7.6
STM	107.62	35.87	SGS-Thomson Microelectronics	101.00	4.63	4.8
SLR	51.87	17.68	Solectron Corp	48.88	1.25	2.6
TER	66.50	15.00	Teradyne	55.81	2.25	4.2
TXN	107.87	45.37	Texas Instruments	102.63	4.38	4.5
UNPH	118.44	31.25	Uniphase (H)	118.44	12.50	11.8
VTSS	52.93	17.12	Vitesse Semiconductor Corp	50.88	2.22	4.6
XLNX	43.81	14.87	Xilinx	42.75	4.13	10.7

COMPUTER SYSTEMS UP 0.2%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
AAPL	47.31	24.68	Apple Computer Inc	36.00	2.69	8.1
ASPX	12.50	1.62	Auspex Systems	10.25	-0.06	-0.6
CPQ	51.25	22.93	Compaq	31.44	-0.25	-0.8
DGN	21.81	7.00	Data General	11.06	-1.00	-8.3
DELL	55.00	15.75	Dell Computer Corp	40.69	2.56	6.7
GTW	84.50	36.12	Gateway 2000 Inc.	68.00	2.19	3.3
HWP	83.87	47.06	Hewlett-Packard Co.	68.31	0.88	-1.3
HIT	77.00	40.18	Hitachi Ltd	76.25	4.69	6.6
IBM	199.25	103.31	IBM	175.56	1.50	0.9
MUEI	24.75	9.68	Micron	11.56	0.13	1.1
MOT	77.37	38.37	Motorola (H)	73.75	-2.25	-3.0
NATI	36.50	17.50	National Instruments Corp	28.63	-0.91	-3.1
NCR	55.75	23.50	NCR	49.50	2.38	5.0
NIPNY	80.50	31.00	NEC	59.06	-0.31	-0.5
PRCM	13.25	3.50	Procom Tech Inc.	4.13	0.00	0.0
SQNT	20.25	5.68	Sequent Computer Systems	8.63	-0.83	-6.8
SGI	20.87	7.37	Silicon Grafix	13.25	-1.44	-9.8
SNE	100.75	60.25	Sony	95.75	0.69	0.7
SUNW	129.00	38.18	Sun Microsystems (H)	125.19	5.75	4.8
TEXM	5.93	2.00	Texas Micro	3.88	-0.25	-6.1
TRCD	4.87	0.37	Tricord Systems	2.63	0.09	3.7
UIS	36.37	17.25	Unisys	29.88	1.06	3.7

INTERNET UP 3.1%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
AMZN	199.12	12.87	Amazon.com	168.00	30.19	21.9
AOL	155.00	17.00	America Online (H)	145.13	19.81	15.8
ATHM	163.50	23.50	@home Corp. (H)	152.50	0.38	0.2
CKFR	46.00	5.75	Checkfree (H)	43.25	2.25	5.5
CYCH	27.75	5.87	Cybercash, Inc.	13.75	-1.25	-8.3
EDFY	20.87	4.62	Edify Corp.	5.63	0.13	2.3
EGRP	66.43	5.00	ETrade Group Inc.	59.50	1.38	2.4
XCIT	151.68	18.00	Excite, Inc. (H)	133.75	-5.25	-3.8
SEEK	100.00	14.87	Infoseek	74.81	5.63	-7.0
LCOS	145.37	20.06	Lycos, Inc.	88.25	-3.00	-3.3
OMKT	29.12	4.25	Open Market, Inc	12.75	-1.19	-8.5
OTEX	34.31	10.00	Open Text Corp. (H)	29.50	5.63	23.6
PSIX	46.25	8.37	PSINet Inc	42.63	3.88	10.0
QDEK	3.00	0.25	Quarterdeck Corp	0.51	0.00	0.0
SDTI	42.75	5.43	Security Dynamics	18.38	1.56	9.3
SPYG	32.25	8.25	Spyglass Inc	8.88	-0.63	-6.6
YHOO	222.50	22.75	Yahoo Inc.	173.31	-0.25	-0.1

STORAGE & PERIPHERALS UP 2.5%

EXCH	52-WEEK	RANGE		APRIL 1 2 PM	WK NET CHANGE	WK PCT CHANGE
ADPT	26.75	7.87	Adaptec Inc	23.94	0.31	1.3
APCC	55.50	26.18	American Power Conversion (L)	26.81	2.06	-7.1
CANNY	25.93	17.00	Canon Inc	24.63	0.00	0.0
DBD	44.68	19.12	Diebold Inc.	24.00	1.38	6.1
EK	88.93	62.25	Eastman Kodak Co	63.75	-1.00	1.5
EMC	135.00	35.81	EMC (H)	126.50	3.25	2.6
IOM	10.18	2.93	Iomega	5.13	0.38	7.9
LXK	116.50	43.75	Lexmark Int'l Group, Nc (H)	110.75	10.19	10.1
QNTM	29.93	10.81	Quantum	18.06	-0.25	1.4
SEG	44.25	16.12	Seagate Technology	30.06	2.69	9.8
STK	51.12	20.12	Storage Technology	28.00	2.19	8.5
TEK	45.12	13.68	Tektronix	25.00	0.69	2.7
XRX	63.00	39.00	Xerox	52.75	0.38	0.7

KEY: **(H)** = New annual high reached in period
(L) = New annual low reached in period

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NATO WEB SITE HOLDS OFF CYBERATTACKS

Viruses and deluge of e-mail slow service

BY ANN HARRISON

An online assault against the primary NATO Web site (*www.nato.int*) last week signaled a cyberwar that, in some ways, mirrored the alliance's air assault against the Serbs.

A group of international crackers deployed conventional weapons against an enemy from a variety of locations, managing to impede access to the site but not shut it down.

NATO webmaster Chris Scheurweghs stressed that the online assault hadn't compromised classified NATO networks, which are kept separate from those supporting the public Web site.

"This is first time I have seen [a] cyberwar since the operation started," Scheurweghs said. "There has been a systematic effort to attack us, and whether it is part of military planning from potential enemies or individuals by themselves, I don't know."

Dozens of computer viruses, sent by crackers in Yugoslavia and other worldwide locations, have targeted NATO networks. Some are Microsoft Word macro viruses such as the Melissa virus that hit corporate networks last week (see story, page 14). So far, NATO has successfully repelled the viruses with help from commercial antivirus tools.

Scheurweghs heads the alliance's Integrated Data Service in Brussels and is one of the webmasters responsible for posting NATO's latest press releases, maps, video clips and transcripts of press conferences on NATO operations. The site is heavily used by journalists and others seeking information on the military campaign against Yugoslavia.

"By offering information from our sources and from the enemy side, they can compare sources and make their own judgments," Scheurweghs said. "By blocking our sources, you really come into a propaganda war."

After NATO's daily afternoon press conferences, traffic to the Web site is particularly heavy. Last Thursday, about 74G bytes of data were downloaded from the site over three hours after that day's press conference.

The unsophisticated crackers are using tried-and-true tactics. They have saturated the site's 1.6M-byte line with pings, which are requests for the machine to identify itself and confirm its status. Each ping contains only 32 bits of information, and Scheurweghs said he was astonished that massive pinging could eat up so much bandwidth.

The webmaster said the ping attack significantly slowed access to the NATO site for a few hours on March 30. Network administrators finally blocked all commands to the servers except those that send mail and download Web pages.

Other amateur attackers are spamming the site with thousands of e-mail messages, Scheurweghs said.

Richard Power, editorial director of the Computer Security Institute in San Francisco, said these are unsophisticated nuisance attacks that are difficult to prevent. Whereas stealthy crackers typically target classified networks, he said, this is more like the cyberspace equivalent of a protest march.

But he noted that 400 people in cyberspace can do much more than 400 people with placards in front of NATO headquarters. "All they have to do is stay on their keyboards and send the same message," Power said.

In fact, Scheurweghs said last week's announcement about the attack on the site may have made the NATO webmaster's job more difficult by giving other crackers ideas.

NATO authorities are trying to trace the spammers through their domain name server (DNS) numbers, some of which appear to be coming from universities.

"If we can trace the DNS back to a university or NATO country, we will certainly try to take legal steps," Scheurweghs said. But there may not be international laws in place to prosecute, he added. ◗

THE ASSOCIATED PRESS

A KOSOVO LIBERATION ARMY SOLDIER, seen through a bullet-riddled window, surveys the village of Svrk, Kosovo

Continued from page 1

Kosovo E-Mail

censorship by Serbian authorities. But because e-mail postings and Web surfing can be traced, a breach of privacy can be life-threatening.

The most likely threat is that Serb authorities could read unprotected messages on public mailing lists and use header information to track down the sender, said Lance Cottrell, president of Anonymizer.

Cottrell explained that browsers exported from the U.S. are crippled to only 40-bit Secure Sockets Layer, which Serbs could crack if they did real-time interception. He said the Anonymizer site directs users to a patch at *www.fortify.net*, which upgrades international versions of the Netscape browser to 128-bit strength.

"The Anonymizer only protects the person from the Anonymizer out to the rest of the world. The connection to the Anonymizer is unprotected and is open to being intercepted," said Scott Ellentuch, a communications security specialist at The Telecom Security Group in Newburgh, N.Y. "If they really wanted to, they could pinpoint where the person is coming from."

Anonymizer, which also provides a free anonymous remailing service via its Mixmaster Web Interface, has set up the secure, anonymous Kosovo e-mail system to eliminate the usual delays with Mixmaster. Mixmaster can need 12 hours to two days to forward anonymous messages between servers, which store and send messages in random order.

Anonymizer launced the Kosovo project March 26. Thousands of people per day are estimated to be using the services. ◗

Continued from page 1

Windows 2000

vice president of Lombard Canada Inc., a $500 million insurance company in Toronto. "Frankly, it would be best to wait until those things are ready rather than getting a service pack."

Moses said that by October, he will be focused on being prepared for year 2000 issues and won't be in any position to deploy Windows 2000.

Brian McGuire, vice president of Econometrics Inc., a database marketing firm in Chicago, said he would rather wait. "I think they're trying to beat the date so people don't slam them for being late all the time," he said. "As far as delaying tools, what's the point of releasing it if I'm not going to have everything they promised?"

Karan Khanna, a Microsoft product manager, said users will be able to deploy every feature in Windows 2000 when it ships. "Windows 2000 Beta 3 will be pretty much feature-complete," he said. "You'll have Intellimirror and Active Directory."

Active Directory is a Yellow Pages-like listing of files, users, servers and devices. It was designed to help information technology administrators keep track of and manage Windows 2000 servers and desktops. Intellimirror is a new desktop management feature. Windows 2000 is also slated to include beefed-up security capabilities.

But Kleynhans and two third-party developers who have been briefed by Microsoft said the features will be available, but tools within them will be missing.

"Their 'Move Tree' tool in Active Directory only handles moving users from one location to another, but it doesn't handle moving organizational units or the contents of one domain to another," said one third-party developer.

Kleynhans said the missing Active Directory management tools would give IT administrators fine-grained control over their network directory and domains. "Administrators will be able to add users, add systems and manage the directory at a certain level, but to prune or merge directories — some of the things you don't do every day but the really big tasks — those tools will be a little sparse," he said. ◗

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INSIDE LINES

WE HAVE SEEN THE FUTURE . . . In Charleston, W. Va., where county officials chose April 1 for a **year 2000 drill**. Kanawha County shut down its computers for the day, forcing 911 operators to dispatch police, fire and ambulance crews **using index cards** and office workers to flip through thick printouts to check taxpayer information. Emergency services director **Bill White** said the county's computers have all had year 2000 upgrades, but county commissioners ran the drill – which went off successfully – as a precaution.Why on **April Fool's Day**? "It was just a good day to have it," he said.

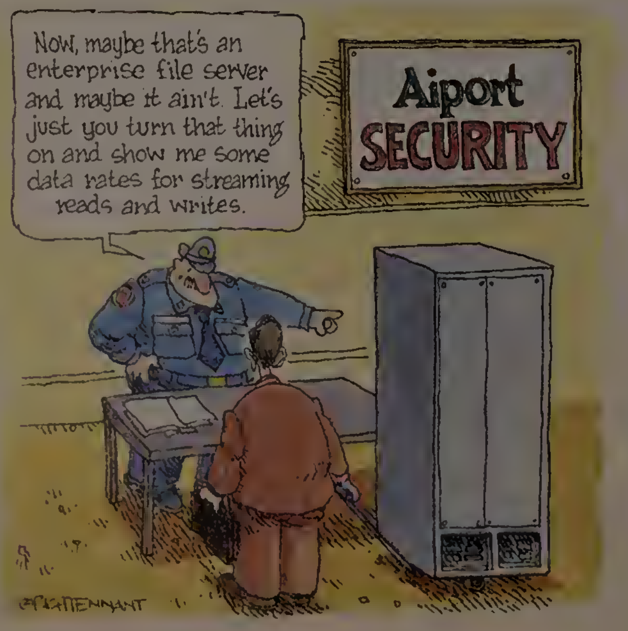
IT ALL DEPENDS ON HOW YOU DEFINE 'CRITICAL' Maybe the best source for plain-speaking federal information on Y2K's impact is at the **Federal Emergency Management Agency**'s Y2K for Kids Web site. "You may not have electricity for a day or two," it warns. "Your computer **might add numbers wrong,**" and "Some stores might not be able to get in your favorite books and games." Contrast that with a statement on the **President's Council for Year 2000 Conversion** site: "Major national disruptions in critical services are unlikely."

OVERHEARD Atlantic Richfield IT manager **Mark Armentrout** on how things could be worse, after BP Amoco announced it will buy Arco and consolidate IT operations: **"We could be in Kosovo."** . . . Federal Communications Commissioner **Michael Powell**, unclear on the concept of letter grades for Y2K fixes: "Everyone in the industry needs the next assessment to show them receiving **a big 'E' for effort**." . . . Virus expert **Fred Cohen**, whose Web site has been specifically bombarded with electronic attacks by the **Papa virus:** "I guess it just comes with the territory."

NOT SURE WHO WON, BUT WE KNOW WHO LOST Watch out for cracking contests. Hip Belgian backpack maker **Kipling** promoted its new **"hacker" line of backpacks** last month with a competition, promising to give a pack to anyone who could **break into the company's site** (*www.kipling.com*). The site's security held up until an enterprising hacker managed to acquire a password from a Kipling employee. As of last Friday, the site was "under reconstruction," sporting a big red X and the words, **"Sorry, we've been cracked."**

BUT SERIOUSLY, FOLKS The **Internet** may be transforming the April Fool's gag – how else would Americans hear the BBC's **phony "new European national anthem,"** whose lyrics are all in German (*news.bbc.co.uk/olmedia/310000/audio/_310401_anthem.ram*)? On the IT news side was the widely e-mailed Microsoft press release announcing **MS-Linux** (it runs all Windows applications). The hoax quotes Linux creator **Linus Torvalds** calling the deal "a great fit . . . we both have the same goal, which is **total world domination**." News editor **Patricia Keefe**'s goal is to hear your news tips and tidbits at **patricia_keefe@computerworld.com** or call (508) 820-8183.

The 5th Wave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WEIRD WILD WEB

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Crime Time • *www.crimetime.com* • It's an *L.A. Confidential*-style site for licensed private investigators, with a daily crime report, the Black Book (reverse directories) and the "The P.I. Digest" newsletter full of tips and tricks.

Pop-Up Videos • *www.popupvideo.com* • Official site of cable channel VH-1's *Pop-Up Videos* show, which adds snippy captions to music videos. It includes a "Pops They Stopped" section for shows that were yanked because the biting commentary upset the artists.

Mars Patrol • *www.rocketusa.com* • Retro space toys including the Mars Explorer flying space saucer (photo), with flashing lights, bump-and-go action and engine sound.

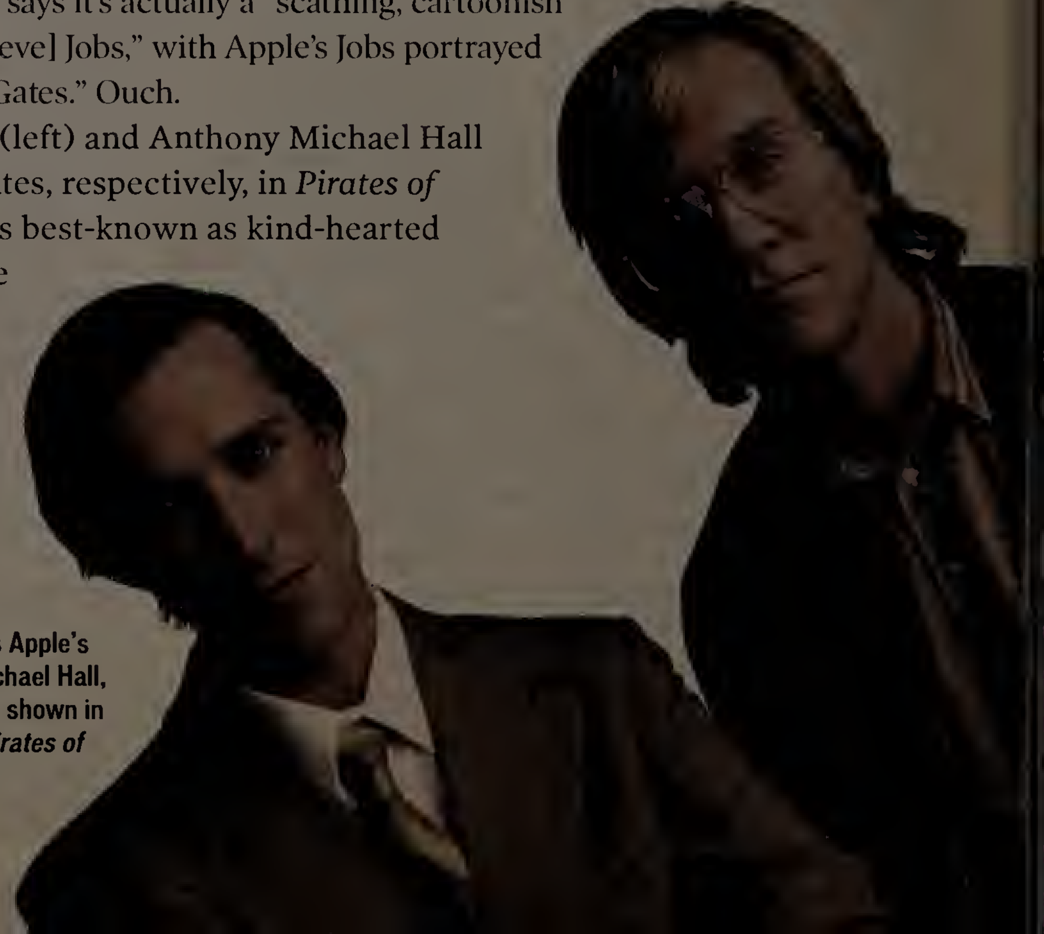
Advertising Graveyard • *www.zeldman.com/ad.html* • A selection of rejected print and Web ads, rescued from the scrap heap. For example, there's a never-released ad for the Beatles Anthology album that notes : "No one ever played 'Disco Duck' backwards to look for clues."

Pet Jewelry • *www.petjewelry.com* • Your pet will look like a million bucks in bejeweled "Pet Branklets" and collar charms.

JOBS, GATES PORTRAYED AS EVIL GEEKS IN MOVIE

BILL GATES is headed for another public-relations disaster on video. The TV movie *Pirates of Silicon Valley,* which premieres June 20 on TNT *(http://tnt.turner.com),* is ostensibly about "the passion, luck and genius" of the founders of Microsoft and Apple from the early 1970s to the mid-1980s. But *Fortune* magazine says it's actually a "scathing, cartoonish swipe at Gates and [Steve] Jobs," with Apple's Jobs portrayed as "even nastier than Gates." Ouch.

Actors Noah Wyle (left) and Anthony Michael Hall will play Jobs and Gates, respectively, in *Pirates of Silicon Valley.* Wyle is best-known as kind-hearted Dr. John Carter in the TV show *E.R.;* Hall has played determined geeks in several films, including the 1985 teen flick *The Breakfast Club.*



ACTORS Noah Wyle (left), as Apple's Steve Jobs, and Anthony Michael Hall, as Microsoft's Bill Gates, are shown in character for the TNT film *Pirates of Silicon Valley.*

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